*Final*

# NEVADA TRAINING INITIATIVE ENVIRONMENTAL ASSESSMENT

**United States Air Force**
**Air Combat Command**

July 2003

# Report Documentation Page

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14. ABSTRACT
**The purpose of the Nevada Training Initiative (NTI) is to fulfill the Air Force need to train aircrews and Security Forces in a modern urban environment at NTTR. NTI would implement two separate proposed actions. Proposed Action One would establish and operate a set of integrated, realistic targets and assets defined as the HTTC as well as associated facilities and infrastructure for U.S. and Allied aircrew training against urban targets. The HTTC and associated facilities would simulate an urban environment for aircrew training. The Air Force identified three alternatives for Proposed Action One: two action alternatives and the no-action alternative. Alternative 1A would locate the HTTC on Range 64 (South Range) of NTTR. Alternative 1B would place the HTTC on Range 62 (South Range) of NTTR. Each action alternative would meet the operational requirements and need for aircrew training in an urban environment. Alternative 1C, as required under CEQ regulations (40 CFR 1502.14 (d)), is the no-action alternative where the HTTC and associated facilities and infrastructure would not be developed. Distinct from Proposed Action One, Proposed Action Two would construct and operate a MOUT groundtraining area and associated facilities and infrastructure for the Air Force Security Forces (Security Forces) at Range 63A. This facility would realistically simulate an airbase environment. Proposed Action Two also has three alternatives?two action alternatives (2A and 2B) and the no-action alternative (2C). The MOUT training facility would be at the same location under both action alternatives; it would be constructed at the existing Security Forces training area on Range 63A within NTTR. The locations of associated facilities (i.e., academic, lodging, dining, and kennel facilities) differentiate Alternatives 2A and 2B. Under Alternative 2A, these associated facilities would be constructed at Indian Springs Air Force Auxiliary Field (ISAFAF). For Alternative 2B, they would be constructed on Air Force lands across U.S. Highway 95 from ISAFAF. Either action alternative would fulfill the need for the MOUT training facility. Under the no-action alternative, 2C, no changes to existing facilities and no construction would occur.**

15. SUBJECT TERMS

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAA | Anti-aircraft Artillery |
| AFB | Air Force Base |
| AFI | Air Force Instruction |
| AIRFA | American Indian Religious Freedom Act |
| AQCR | Air Quality Control Region |
| BAQ | Bureau of Air Quality |
| BLM | Bureau of Land Management |
| BMP | Best Management Practices |
| CAA | Clean Air Act |
| CCHD | Clark County Health District |
| CDNL | C-Weighted Day-Night Sound Level |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CO | Carbon Monoxide |
| CRMP | Cultural Resources Management Plan |
| CWA | Clean Water Act |
| DAQM | Department of Air Quality Management |
| dB | Decibels |
| DNL | Average Day-Night Sound Level or $L_{dn}$ |
| DOE | Department of Energy |
| DNWR | Desert National Wildlife Range |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| EOD | Explosive Ordnance Disposal |
| EPA | Environmental Protection Agency |
| FONSI | Finding of No Significant Impact |
| FY | Fiscal Year |
| GIS | Geographic Information System |
| HTTC | High-technology Test and Training Complex |
| IICEP | Intergovernmental and Interagency Coordination of Environmental Planning |
| ISAFAF | Indian Springs Air Force Auxiliary Field |
| $L_{dnmr}$ | Onset Rate Adjusted Monthly Day-Night Sound Level |
| LEIS | Legislative Environmental Impact Statement |
| MCLs | Maximum Contaminant Levels |
| MOUT | Military Operations in an Urban Terrain |
| NAAQS | National Ambient Air Quality Standards |
| NAC | Nevada Administrative Code |
| NAGPRA | Native American Graves Protection and Repatriation Act |
| NAIP | Native American Interaction Program |
| NDEP | Nevada Department of Environmental Protection |
| NDOW | Nevada Division of Wildlife |
| NDWR | National Division of Water Resources |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxide |
| NPDES | National Pollution Discharge Elimination System |
| NRHP | National Register of Historic Places |
| NTTR | Nevada Test and Training Range |
| NTI | Nevada Training Initiative |
| $O_3$ | Ozone |
| PM | Particulate Matter |
| PSD | Prevention of Significant Deterioration |
| RF | Radio Frequency |
| SAM | Surface-to-Air Missile |
| SHPO | State Historic Preservation Officer |
| SIP | State Implementation Plan |
| $SO_2$ | Sulfur Dioxide |
| SRCC | South Range Command Center |
| SWPPP | Stormwater Pollution Prevention Plan |
| TOSS | Television Optical Scoring System |
| TSP | Total Suspended Particles |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| VOCs | Volatile Organic Compounds |
| WISS | Weapons Impact Scoring System |

## FINDING OF NO SIGNIFICANT IMPACT

### 1.0 NAME OF THE PROPOSED ACTION

Military Operations in Urban Terrain Training Complex.

### 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The U.S. Air Force, Headquarters Air Combat Command (ACC) proposes to construct a Military Operations in Urban Terrain (MOUT) Training Complex at the Nevada Test and Training Range (NTTR), Nevada. This action would establish a modern simulated urban airbase environment for Air Force Security Forces ground training. Components of the MOUT Training Complex would include a simulated airbase, academic, lodging, dining, and kennel facilities along with upgrades of existing facilities. The MOUT would encompass approximately 97 acres, with construction phased over a 5-year period. Training levels would not change from those currently conducted.

Three alternatives to the proposed action were considered in the analysis: two action alternatives and the no-action alternative. Both action alternatives are located in the South Range of NTTR and propose placing the MOUT Training Complex on Range 63A, with variances in the location of the associated training facilities. Alternative 2A would involve constructing the MOUT, including a partial simulated runway, and upgrading existing facilities at the current Range 63A training site. The existing operations and maintenance facility, munitions storage igloo, logistics warehouse and parking lot at Indian Springs Air Force Auxiliary Field (ISAFAF) would be upgraded. In addition, new academic, lodging, dining, and military working dog kennel facilities would be constructed at ISAFAF. Under Alternative 2B, construction of the MOUT at the current training site and upgrading of existing facilities at ISAFAF would be the same as in Alternative 2A. However construction of the new academic, lodging, dining, and military working dog kennel facilities would occur on AF owned lands across I-95, south of ISAFAF. Under Alternative 2C, the no-action alternative, no new training, no changes to existing facilities and no construction would occur.

An environmental assessment (EA) was prepared for the MOUT proposal along with a proposal to construct a High Technology Test and Training Complex (HTTC) on NTTR. The EA considered potential impacts of each proposed action individually and cumulatively. The HTTC proposal is currently awaiting completion of Section 7 Endangered Species Act consultation and therefore will have a separate finding presented once consultation is complete. This Finding of No Significant Impact (FONSI) is specific to the MOUT action.

### 3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The EA provides an analysis of the potential environmental impacts resulting from implementing the proposed action and any of the alternatives. Six resource areas were evaluated in detail to identify potential environmental consequences of each alternative. Resource categories discussed in the EA are: air quality, biological resources, cultural resources, soils and water, socioeconomics, and noise. Based on the environmental analysis, implementation of either of the MOUT action alternative would result in no significant impact to any resource category or significantly affect existing conditions at NTTR.

**Air Quality:** The proposed action would result in minimal and temporary contributions to regional air emissions, the majority of which would be generated during construction. Both action alternatives are located in non-attainment areas for carbon monoxide (CO) and particulate matter great than 10 microns ($PM_{10}$). Construction would occur over a five-year period beginning in FY02. The maximum annual emissions from construction would be well below the dèminimus (70 tons/year $PM_{10}$ and 100 tons per year CO) thresholds established by the General Conformity Rule under either action alternative. The largest amount of emissions would occur in 2005, and generate approximately 19 tons of $PM_{10}$ and 27 tons of CO. The majority of these emissions would be generated by construction activities and would be temporary in nature. Emissions created would remain well below thresholds set by local, state, and federal air quality standards.

**Biological Resources:** Approximately 97 acres of vegetation would be affected if either MOUT action alternative were implemented. Many of the proposed MOUT components are on previously disturbed land. Due to the small, scattered, and previously disturbed nature of the proposed sites and the large size of NTTR. No significant impact to biological resources would be expected. There are no known wetlands or waters of the U.S. located within alternatives 2A or 2B areas, however, grading, filling, or road crossings of washes and arroyos would be assessed prior to construction beginning. Impacts to wildlife from the 97-acre habitat loss and construction from either action alternative would be negligible due to the previously developed and disturbed nature of the sites.

Action alternatives 2A and 2B lie within the general habitat of the desert tortoise, a federally listed threatened species. Based on the absence of critical or suitable desert tortoise habitat within the potentially affected area, past desert tortoise surveys and the existing disturbance of the action alternatives sites neither action alternative would adversely affect desert tortoise populations or species recovery. To minimize potential impacts, the Air Force would adhere to requirements of the current Biological Opinion from the U.S. Fish and Wildlife Service. No rare plants are known to occur within approximately 0.5 miles of the proposed construction areas therefore, no impacts would be likely.

**Cultural Resources:** No National Register of Historic Places eligible archaeological, architectural, or traditional resources have been identified at either MOUT action alternative site. Therefore, associated construction and upgrading of facilities would have no adverse effect on significant cultural resources.

**Soils and Water:** Projected impacts to soil and water would be minimal. Under either of the proposed action alternatives, soil erosion potential would be generally slight to moderate due to the type of soil and slight slope of the area. Construction activities would involve the removal of a minimal amount of vegetation and soils as well as grading operations. These activities would expose underlying soil to wind and water erosion and could result in sedimentation in surface impoundments. The use of standard grading practices, soil stabilization methods, and the creation of culverts to channel storm water runoff, along with watering the construction sites to limit fugitive dust, would minimize these effects.

**Socioeconomics:** The size and nature of socioeconomic effects associated with the proposed MOUT action within the context of the general Las Vegas area, would be negligible. Construction would occur over a five-year period beginning in FY02. Construction activities may employ local workers who would commute daily from the Las Vegas area, or those who may temporarily relocate to Indian Springs on a short-term temporary basis. The majority of construction materials would be purchased outside the local region and transported to the site, resulting in negligible local impacts. A small, short-term positive effect on the local economy of Indian Springs would occur during the construction phases. However, any construction impacts experienced in the Las Vegas economy would be insignificant given the size and diversity of the Las Vegas metropolitan economy.

**Noise:** Short-term localized noise increases from construction and upgrades would occur in stages over 5 years. Under Alternative 2A, construction would occur in the ISAFAF environs and would be compatible with ongoing activities. However, under Alternative 2B, facilities would be constructed adjacent to the Indian Springs community. All construction would take place during daylight hours to minimize noise to any off-base receptors.

## 4.0 CONCLUSION

On the basis of the findings of the Environmental Assessment, no significant impact to human health or the natural environment would be expected from implementation of either of the MOUT action alternatives. Therefore, issuance of a Finding of No Significant Impact is warranted, and preparation of an Environmental Impact Statement, pursuant to the National Environmental Policy Act of 1969 (Public Law 91-190) is not required.

Robert C. Barrett
Chairperson, ACC Environmental Leadership Board

8 AUG 2002
Date

# FINDING OF NO SIGNIFICANT IMPACT

## 1.0 NAME OF THE PROPOSED ACTION

High–technology Test and Training Complex

## 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The U.S. Air Force, Headquarters Air Combat Command (ACC) proposes to establish a High–technology Test and Training Complex (HTTC) on the Nevada Test and Training Range (NTTR). The HTTC would include target buildings, a remotely operated moving convoy, a maintenance center, as well as communication, fiber optic cable, and power lines, threat emitters, upgrade of existing roads and fiber optic lines, and construction of a new South Range Command Center. Integrated together, the components of the HTTC would realistically simulate a modern urban environment for United States and Allied aircrew training.

Under the proposal, the HTTC would be established at one of two locations within the South Range: Alternative 1A, encompassing 869 acres on Range 64 or Alternative 1B encompassing 946 acres, on Range 62. In addition, both alternatives would upgrade up to 24 existing scoring system sites and establish four new Weapon Impact Scoring System sites. In addition to the two action alternatives, the no-action alternative was also analyzed. Under the no-action alternative the HTTC with its associated facilities and infrastructure would not be constructed.

An environmental assessment (EA) was prepared for the HTTC proposal along with a proposal to construct a Military Operation in Urban Terrain Training Complex (MOUT) on NTTR. The MOUT would establish a modern simulated urban airbase environment for Air Force Security Forces ground training on NTTR. It would encompass approximately 97 acres, with construction phased over a 5-year period. The EA considered potential impacts of the two proposed actions individually and cumulatively. A Finding of No Significant Impact for the MOUT proposal was signed on August 8, 2002; however, a finding on the HTTC proposal was held until Section 7 Endangered Species Act (ESA) consultation was completed. A final Biological Opinion for activities on the South Range of the NTTR was issued by the U.S. Fish and Wildlife Service (USFWS) on June 17, 2003. This Finding of No Significant Impact reflects information provided in the Opinion specific to Desert tortoise impacts.

## 3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The EA provides an analysis of the potential environmental impacts resulting from implementing the proposed action and any of the alternatives. Six resource areas (air quality, biological resources, cultural resources, soils and water, socioeconomics, and noise) were evaluated in detail to identify potential environmental consequences of each alternative.

**Air Quality:** Emissions would be generated during construction and operation of the HTTC. Construction emissions would be temporary, spread out over a 4-year time period and dispersed over at least 869 acres. Operational emissions from either action alternative would be insignificant since the proposal does not require increased aircraft sortie-operations. Minimal emissions would result from day-to-day ground activities on the HTTC; however, these emissions would be localized and not cause an exceedance of ambient air quality standards. Both action alternatives would occur within the unclassified area for state and federal air quality standards and outside the Las Vegas Valley non-attainment area, therefore a conformity determination would not be required. During fiscal years (FY)

04 through 06 construction for the HTTC and MOUT would overlap. Emissions would reach maximum levels in FY 05 but because the two proposed actions are geographically separated and their respective emissions are localized in nature, they would not be additive to any measurable degree.

**Biological Resources:** Under alternative 1A, about 869 acres of the South Range would be disturbed for new roads, the urban training complex itself, emitter site construction, as well as scoring system upgrades. Under alternative 1B, a maximum of 946 acres would be disturbed by the HTTC proposal. At least 32 of the 38 scoring and emitter sites under both action alternatives have been previously disturbed to varying degrees from previous off-road activities or ordnance-delivery training. There are no known wetlands or waters of the U.S. located within alternatives 1A or 1B areas. The HTTC proposal would have minimum impact to wildlife since construction would occur over a 4-year time period, species would have time to relocate to similar habitat outside the construction area. Loss of forage habitat would not impact species, since plenty of similar vegetation would remain available on the approximately 2.9 million acres of the NTTR. A maximum of approximately 1050 acres of vegetation would be affected if both the HTTC and MOUT proposals were implemented. These 2 proposals would occur over a small portion of the total NTTR acreage. In addition the sites are scattered and much of the acreage is previously disturbed. Therefore cumulatively, no significant impacts to vegetation or wildlife would occur.

Most of alternative 1A and 1B lay within the general habitat of the Mojave population of desert tortoise (Gopherus agassizii), a federally listed threatened species. A 100-percent presence/absence survey of the proposed HTTC action alternative locations was conducted in May and June of 2002. These surveys found a total of 41 tortoise burrows and 3 live tortoise on the Proposed Range 62 HTTC site, and three potential burrows and no Desert tortoise on the proposed Range 64 HTTC site. In September 2002, USFWS initiated formal consultation with the Air Force, and a final Biological Opinion (BO) was issued June 17, 2003. The BO outlined terms and conditions the Air Force must follow to insure impacts to the desert tortoise from HTTC construction and operation would be minimized. Based on implementation of these terms and conditions, the USFWS issued an opinion that the HTTC and MOUT proposals would not likely jeopardize the continued existence of the threatened Desert tortoise. In addition, under Section 9 of the ESA, USFWS issued that no more than 2 Desert tortoises may be killed or injured per year and no more than 20 captured and moved as a result of the HTTC and MOUT proposals.

**Cultural Resources:** The HTTC has the potential to affect one cultural resource property during construction; the Gold Reed mining camp. This site which lies in areas proposed for fiber optic cable installation under both alternative 1A and 1B, is considered eligible to the National Register of Historic Places. However, construction disturbance would be avoided by restricting disturbance to an area within 15 feet north of the existing road and fiber optic cable would be placed on above-ground poles, to avoid the site. By avoiding the site, no adverse impacts would occur to the characteristics of the Gold Reed site that make it eligible. No adverse impacts would occur from implementing the MOUT proposal; therefore cumulatively no adverse impacts to cultural resources would occur from implementing both proposed actions.

**Soils and Water:** Potential impacts to soil and water would be minimal. The proposed HTTC site would lie within an arid setting with annual rainfall of approximately 7 inches. Storm water runoff has been known to cause minor flooding; however, runoff from these infrequent and brief storm events is channeled through natural drainage and quickly infiltrates into the course soil or evaporates. Construction activities would involve the removal of vegetation and soils as well as grading operations. The activities would expose underlying soil to wind and water erosion and could result in sedimentation in surface impoundments. The use of standard grading practices, soil stabilization methods, and the creation of culverts to channel storm water runoff, along with watering the construction sites to limit fugitive dust would minimize these effects. Up to 6 contractors could be added to support HTTC operational activities; however, these additional personnel would increase water consumption by only 4 percent. Current demand on the South Range is only 74 percent of capacity. If both the HTTC and the MOUT proposed actions were undertaken at the same time, at total of approximately 1050 acres would be disturbed. Because both actions are geographically separated and construction measures would be implemented to limit erosion, the potential for adverse effects to soil and water resources would be negative. Water use would not change measurably or exceed current capacities.

**Socioeconomics:** Socioeconomic effects associated with the HTTC action, within the context of the general region of influence (Las Vegas area), would be negligible. Construction would occur over a 4-year period beginning in 2004. Construction workers would either commute daily from the Las Vegas area, or may temporarily relocate to Indian Spring on a short-term basis. The majority of construction materials would be purchased outside the local region and transported to the site, resulting in negligible local impacts. A small short-term positive effect to the local Indian Springs economy would occur during the construction phase. However, any construction impacts in the Las Vegas economy would be insignificant when compared to the size and diversity of the Las Vegas metropolitan economy. Implementing both actions simultaneously would not result in negative socioeconomic impacts to the Indian Springs area. Minor additive positive impacts would occur from construction and personal spending over a 5-year period; however, the local Indian Spring economy would be able to accommodate this short-term input into the community.

**Noise:** The proposed action would not increase the number of aircraft sortie operations overall pattern of flight activities over NTTR, therefore aircraft noise levels would remain unchanged. Construction noise would be localized, isolate, and spread out over a 4-year period, and would result in negligible impacts to the environment. Potential wildlife impacts from construction noise would be temporary. The combined environmental impact from undertaking both the HTTC and the MOUT proposal would be negligible. Short-term construction noise would occur but would be dispersed over wide geographic areas; therefore combined impacts to the environment would not occur.

## 4.0 CONCLUSION

On the basis of the findings of the Environmental Assessment, no significant impact to human health or the natural environment would be expected from implementing either of the HTTC action alternatives, either individually or cumulatively with the MOUT proposal. Therefore, issuance of a Finding of No Significant Impact is warranted, and preparation of an Environmental Impact Statement, pursuant to the National Environmental Policy Act of 1969 (Public Law 91-90) is not required.

Robert C. Barrett
Chairperson, ACC Environmental Leadership Board

11 Jul 03
Date

# COVER SHEET
# Nevada Training Initiative
# Environmental Assessment

**Responsible Agency:** United States Air Force, Air Combat Command

**Proposed Actions** : : To construct and operate at the Nevada Test and Training Range (NTTR): 1) a High-technology Test and Training Complex (HTTC) and associated facilities and infrastructure for U.S. and Allied aircrew training and 2) a Military Operations in Urban Terrain (MOUT) training area and associated facilities and infrastructure for the Air Force Security Forces.

Written comments and inquiries regarding this document should be directed to:


HQ ACC/CEVP
129 Andrews St., Suite 102
Langley AFB, VA 23665-2769
ATTN: Ms. Sheryl Parker


In addition, the document can be viewed on and downloaded from the world wide web at www.cevp.com.

**Designation**: Final Environmental Assessment


**Abstract**: The purpose of the Nevada Training Initiative (NTI) is to fulfill the Air Force need to train aircrews and Security Forces in a modern urban environment at NTTR. NTI would implement two separate proposed actions. Proposed Action One would establish and operate a set of integrated, realistic targets and assets defined as the HTTC as well as associated facilities and infrastructure for U.S. and Allied aircrew training against urban targets. The HTTC and associated facilities would simulate an urban environment for aircrew training. The Air Force identified three alternatives for Proposed Action One: two action alternatives and the no-action alternative. Alternative 1A would locate the HTTC on Range 64 (South Range) of NTTR. Alternative 1B would place the HTTC on Range 62 (South Range) of NTTR. Each action alternative would meet the operational requirements and need for aircrew training in an urban environment. Alternative 1C, as required under CEQ regulations (40 CFR 1502.14 (d)), is the no-action alternative where the HTTC and associated facilities and infrastructure would not be developed.

Distinct from Proposed Action One, Proposed Action Two would construct and operate a MOUT ground-training area and associated facilities and infrastructure for the Air Force Security Forces (Security Forces) at Range 63A. This facility would realistically simulate an airbase environment. Proposed Action Two also has three alternatives—two action alternatives (2A and 2B) and the no-action alternative (2C). The MOUT training facility would be at the same location under both action alternatives; it would be constructed at the existing Security Forces training area on Range 63A within NTTR. The locations of associated facilities (i.e., academic, lodging, dining, and kennel facilities) differentiate Alternatives 2A and 2B. Under Alternative 2A, these associated facilities would be constructed at Indian Springs Air Force Auxiliary Field (ISAFAF). For Alternative 2B, they would be constructed on Air Force lands across U.S. Highway 95 from ISAFAF. Either action alternative would fulfill the need for the MOUT training facility. Under the no-action alternative, 2C, no changes to existing facilities and no construction would occur.

# EXECUTIVE SUMMARY

# EXECUTIVE SUMMARY

This draft Environmental Assessment (EA) describes the potential environmental consequences resulting from the implementation of the Nevada Training Initiative (NTI) at Nevada Test and Training Range (NTTR). This initiative comprises two separate unconnected actions: 1) construct and operate a High-technology Test and Training Complex (HTTC) and associated facilities and infrastructure for U.S. and Allied aircrew training against urban targets and 2) construct and operate a Military Operations in Urban Terrain (MOUT) ground training area and associated facilities and infrastructure for the Air Force Security Forces (Security Forces). This draft EA was prepared by the Air Force, Headquarters Air Combat Command (HQ ACC), in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA, and Air Force Instruction (AFI) 32-7061 the Environmental Impact Analysis Process (EIAP), as promulgated in Title 32 of the Code of Federal Regulations (CFR) Part 989.

The Air Force completed the environmental analysis for Proposed Action Two (MOUT), and a Finding of No Significant Impact (FONSI) was signed on August 8, 2002. The public was notified of the decision through newspaper media and the FONSI made available to interested individuals, government agencies, and public libraries.

**PURPOSE AND NEED FOR THE NEVADA TRAINING INITIATIVE**

Congress, in the National Defense Authorization Act (Fiscal Year 2000), expressed its concern that U.S. military services have not sufficiently emphasized urban warfare training. Meeting operational requirements for missions in these urban environments present a set of challenges to the Air Force that need to be addressed through training in realistic, variable urban contexts. By investing in better and more appropriate training facilities, technologies, and education the Air Force can generate substantial advantages over enemies in an urban terrain while avoiding civilian loss of life, damage to humanitarian missions (e.g., medical and aid facilities and religious centers), and destruction of private property. In addition, Security Forces need to be prepared to respond to terrorist or small commando assaults on airbase environments with little or no collateral damage or civilian loss of life in both wartime and peacetime missions.

The purpose of NTI is to fulfill the Air Force need to train aircrews and Security Forces in a modern urban and airfield environment at NTTR. NTI would implement two separate proposed actions.

Proposed Action One would establish and operate a set of integrated, realistic targets and assets (the HTTC) which simulate an urban environment for aircrews at one of two locations in the South Range of NTTR. Distinct from Proposed Action One, Proposed Action Two would construct and operate a MOUT complex at Range 63A that realistically simulates an airbase environment and construct facilities and infrastructure to support Security Forces training at one of two locations in the Indian Springs area.

***Aircrews Training in an Urban Environment.*** Under urban combat scenarios, aircrews flying different types of aircraft, with differing missions, need to identify and destroy a variety of defined targets while facing myriad threats. These varying types of aircraft include the helicopters and their special operations; low-altitude A-10s and AC-130s and their associated weapons systems; medium-altitude fighter jets such as the F-15s and F-16s and their ordnance capabilities that include precision-guided munitions; the high-altitude bombers such as the B-52s, B-1s, and B-2s and their precision-guided munitions, as well as the reconnaissance and intelligence gathering aircraft like the E-8s, E-3s, and Unmanned Aerial Vehicles (Predators and Global Hawks).

Potential target types vary considerably, and can change daily depending upon the nature of the conflict. The varying targets can include airfields or airplanes, communication facilities, radars, anti-aircraft artillery (moving and stationary), roads, fuel depots, bridges, railroads, trains, convoys, buildings, and even specific rooms. Ground troop concentrations and armor (e.g., tanks) also form important targets. These targets can be located within cities, on major railways or highways, adjacent to hospitals, near rivers, or in the middle of deserts. Aircrews face various threats as well when approaching and departing these targets including anti-aircraft artillery (AAA), surface-to-air missiles (SAMs), and man-portable air defense weapons. As encountered in Kosovo, targets may be well camouflaged, or revetted, or surrounded by decoys. To meet the challenges of these missions, aircrews need to train against realistic target complexes. Currently, NTTR provides limited, dispersed, and unsophisticated components of this urban training throughout its ranges.

***Security Forces Training in an Urban Airbase Terrain.*** Security Forces must maintain a secure environment at airbases by detecting and engaging enemy forces that threaten sustained air operations. Hostile occupation of an air traffic control tower or wing headquarters could effectively terminate aircraft operations and affect the prosecution of missions throughout a theater of operations. Security Forces are charged with the mission of defending and, if necessary, recapturing occupied facilities on airbases. Typical facilities on an airbase include a runway, control tower, operations building, hangars, fueling facilities, ordnance storage, and streets.

Threats to airbases can range from highly sophisticated combat troops with armor and helicopter support to less sophisticated insurgent or terrorist forces. Security Forces must train for all possible situations and contingencies using realistic, modern facilities.

Existing facilities at NTTR (Range 63A) represent the only site for training Air Combat Command Security Forces currently available in the United States. However, the training area and infrastructure supporting Security Forces at NTTR is inadequate in terms of efficiency, technology, complexity, and realism—it fails to offer a realistic airbase environment.

## PROPOSED ACTIONS AND ALTERNATIVES

The overarching NTI proposal is to implement two separate and distinct proposed actions. Although not interdependent, each proposed action would establish an integrated and linked set of assets that realistically simulate modern urban warfare for Air Force aircrews (Proposed Action One) and airbase acquisition and protection Air Force Security Forces (Proposed Action Two) at NTTR. Proposed Action One would establish an HTTC, associated moving convoy and maintenance center, scoring sites, communication command center, fiber optic cable and communications lines, and threat emitters to realistically simulate an urban environment for aircrews conducting training at NTTR. Proposed Action Two would establish a modern, simulated, urban airbase environment for the Security Forces as well as associated classrooms and infrastructure to support this training.

The Air Force identified three alternatives for Proposed Action One: two action alternatives and the no-action alternative. Alternative 1A would locate the HTTC on Range 64 (South Range) of NTTR. Alternative 1B would situate the HTTC on Range 62 (South Range) of NTTR. Each action alternative would meet the operational requirements and need described above. Alternative 1C, as required under CEQ regulations (40 CFR 1502.14 (d)), is the no-action alternative where the HTTC and associated facilities and infrastructure would not be developed.

Proposed Action Two, the MOUT training facility, has three alternatives also—two action alternatives (2A and 2B) and the no-action alternative (2C). The MOUT training facility would be at the same location under both action alternatives; it would be constructed at the existing Security Forces training area on Range 63A within NTTR. The locations of associated facilities (i.e., academic, lodging, dining, and kennel facilities) differentiate Alternatives 2A and 2B. Under Alternative 2A, these associated facilities would be constructed at Indian Springs Air Force Auxiliary Field (ISAFAF). For Alternative 2B, they would be constructed on ISAFAF-owned property south of U.S. Highway 95. Either action alternative would fulfill the need for the training facility. Under the no-action alternative (2C) no changes to existing facilities would occur.

**SUMMARY OF ENVIRONMENTAL CONSEQUENCES**

This EA provides an analysis of the potential environmental consequences resulting from implementing Proposed Action One and its alternatives (1A, 1B, and 1C), Proposed Action Two and its alternatives (2A, 2B, and 2C), and the combined environmental consequences should both proposed actions occur simultaneously. Six resource categories received a thorough interdisciplinary analysis to identify potential impacts. According to the analysis in this EA, implementation of the proposed actions at any of the action-alternative locations would not result in significant impacts in any resource category. Implementing any of these alternatives would not significantly affect existing conditions at NTTR. The following summarizes and highlights the results of the analysis by resource category.

*Air Quality*—Individually and in combination, Proposed Action One and Proposed Action Two would result in minimal and temporary contributions to regional air emissions. Emissions would predominantly result from construction activities, which would be localized and spread out over several years. These emissions would remain well below thresholds set by local, state, and federal air quality standards.

*Biological Resources*—Based on the dispersed locations, and relatively small size (as compared to NTTR as a whole) of the components of either proposed action, the effects on biological resources would be negligible to minimal. Many of the locations of proposed components are previously disturbed. For Proposed Action One, the HTTC locations for Alternative 1A and 1B lie within the northern limits of the general region for the desert tortoise, a federally listed threatened species. Based on the evidence from previous surveys and the Biological Opinion from the U.S. Fish and Wildlife Service, the Air Force has concluded that neither Alternative 1A nor 1B would adversely affect desert tortoise populations or species recovery. This assessment is based on the absence of critical or suitable desert tortoise habitat within the potentially affected areas, past disturbance to most of the affected locations, and low to very low tortoise population densities within these areas. To minimize potential impacts, the Air Force would adhere to requirements of the June 17, 2003 Biological Opinion from the U.S. Fish and Wildlife Service (USFWS 2003).

*Cultural Resources*—Cultural resources surveys conducted for this proposal and existing data indicate that no component of either proposed action or alternatives would affect cultural resources eligible for or listed in the National Register of Historic Places.

*Soils and Water*—Overall, impacts to soils and water would be minimal. Use of Best Management Practices (e.g., grading, watering, and gravelling) during construction would minimize erosion and reduce effects on ephemeral water courses in the affected areas. Water use under Proposed Actions One or Two would increase minimally and would represent a minor portion of total capacity.

*Socioeconomics*—Within the context of the general Las Vegas area, the size and nature of socioeconomic effects associated with one or both of the proposed actions or alternatives would be negligible. For the small community of Indian Springs, a small short-term, positive effect on the local economy would result during the construction phases of Proposed Actions One and Two.

*Noise*—Since neither proposed action or their alternatives would increase the number or overall pattern of flight activities over NTTR, aircraft noise levels would remain the same within the affected environment defined as baseline conditions. Construction noise would be localized, isolated, remote, and brief, resulting in negligible impacts to the environment.

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# CHAPTER 1

# PURPOSE AND NEED FOR THE NEVADA TRAINING INITIATIVE

# CHAPTER 1
# PURPOSE AND NEED FOR THE NEVADA TRAINING INITIATIVE

## 1.1 INTRODUCTION

The United States Air Force (Air Force) proposes to implement the Nevada Training Initiative (NTI) at Nevada Test and Training Range (NTTR). This initiative comprises two separate actions: 1) construct and operate a High-technology Test and Training Complex (HTTC) and associated facilities and infrastructure for U.S. and Allied aircrew training and 2) construct and operate a Military Operations in Urban Terrain (MOUT) training area and associated facilities and infrastructure to improve training for the Air Force Security Forces (Security Forces). While both proposed actions would occur at NTTR, they are not inter-dependent or connected. They are being analyzed in a single Environmental Assessment (EA) because of their proximity and similarity of timing. The Air Force is conducting this analysis to determine the potential environmental impacts of NTI's two proposed actions: Proposed Action One (HTTC) and Proposed Action Two (MOUT). Figure 1.1 provides an overview of the potentially affected area for both proposed actions.

Proposed Action One would construct and operate a HTTC (composed of target buildings, a remotely-operated moving convoy, maintenance center, as well as communication, fiber optic cable, and power lines), threat emitters, scoring sites, upgrade of existing roads and fiber optic lines, and construction of a new South Range Command Center (SRCC) at Point Bravo. Proposed Action Two would construct and operate a state-of-the-art MOUT at the existing Security Forces training area in Range 63A (R63A) in addition to constructing, upgrading, and operating associated facilities and infrastructure to support this training.

In addition to these action alternatives, the Air Force analyzes the no-action alternative for each of the two Proposed Actions. Under the no-action alternatives, the Air Force would neither construct nor operate an HTTC and MOUT at NTTR at this time.

The Air Force completed the environmental analysis for Proposed Action Two (MOUT), and a Finding of No Significant Impact (FONSI) was signed on August 8, 2002. The public was notified of the decision through newspaper media and the FONSI made available to interested individuals, government agencies, and public libraries.

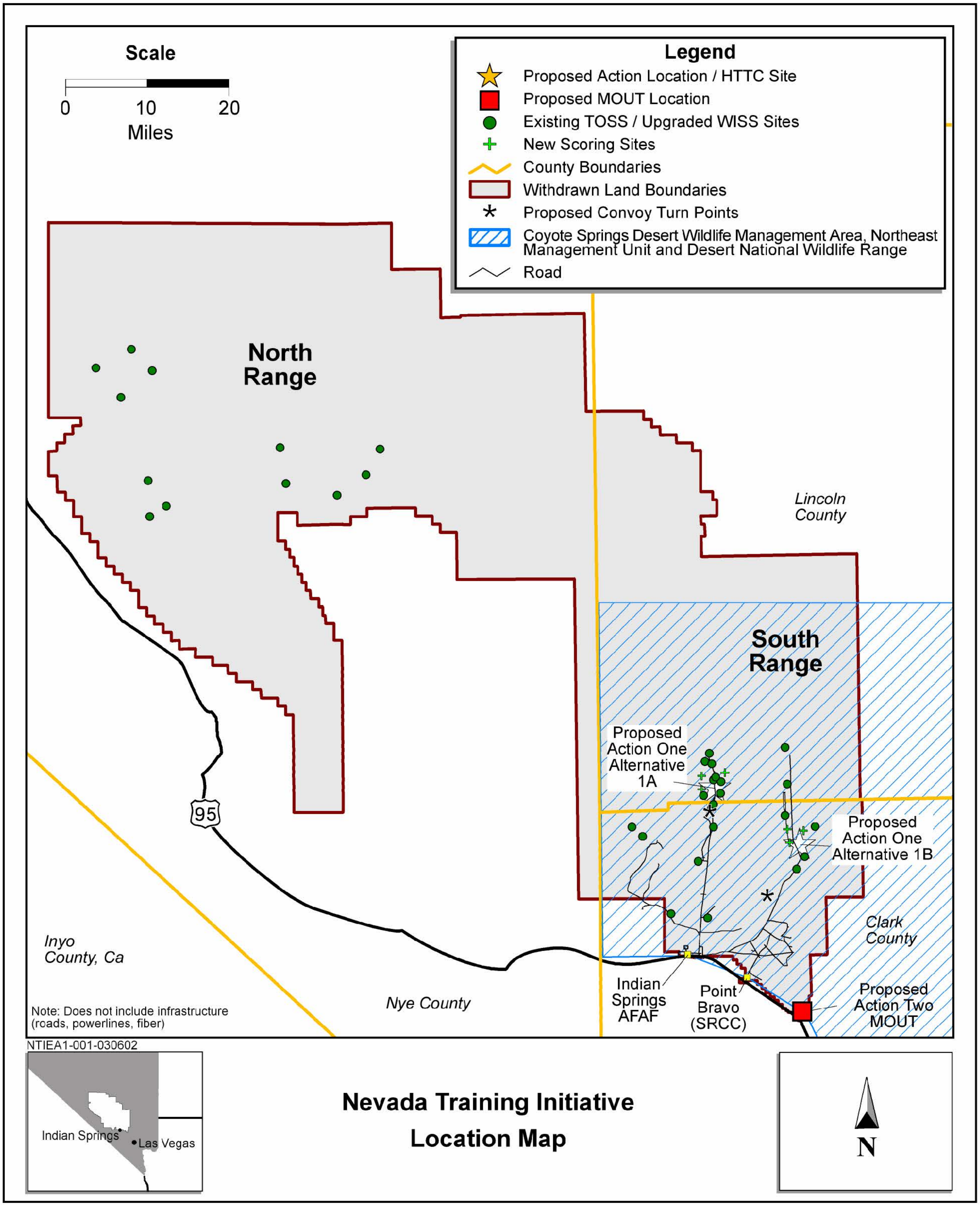


**Figure 1-1 Overview of NTI Proposed Actions One and Two**

## 1.2 LOCATION OF THE NEVADA TRAINING INITIATIVE

NTTR consists of approximately 2.9 million acres in southern Nevada withdrawn from public use as a training area. NTTR comprises two main functional areas, the North Range and the South Range (see Figure 1.1). Both of these are further divided into subranges. Under Proposed Action One, the HTTC and associated facilities and supporting infrastructure would be established at one of two locations within the South Range: Alternative 1A in Range 64 or Alternative 1B in Range 62. In addition, under either alternative, up to 24 Television Optical Scoring Systems (TOSS) would be upgraded and replaced by Weapons Impact Scoring Systems (WISS) in the North and South Range (up to 12 sites in each range); fiber optic lines would be upgraded to accommodate these new WISS sites; and four new WISS sites would be constructed as well.

For Proposed Action Two, both alternatives (2A and 2B) would construct the MOUT and associated infrastructure at Range 63A within the South Range. Under either alternative, the munitions igloo, logistics warehouse, and a paved parking area would also be constructed at the Indian Springs Air Force Auxiliary Field (ISAFAF) base. In contrast, the location of the academic complex, lodging and dining accommodations, as well as the kennel/trainer facility would differ between the two action alternatives: Alternative 2A would place these buildings and infrastructure at the ISAFAF base (north of U.S. Highway 95), Alternative 2B would construct the academic complex, lodging and dining accommodations, as well as the kennel/trainer facility south of U.S. Highway 95, in ISAFAF-owned property.

## 1.3 BACKGROUND

Since the end of the Cold War and the "monolithic" threat from the USSR, U.S. military forces face new and evolving combat scenarios. Not only are aircrews expected to fight battles in an open terrain as found during the Gulf War, but they also must undertake military operations that target specific towns and cities or even particular city blocks and individual buildings. Recent conflicts in areas such as Kuwait City in Kuwait, Mogadishu in Somalia, Sarajevo in Bosnia, Kosovo in Croatia, and Kabul (and various other towns) in Afghanistan highlight these varying military operations. Many missions preclude air strikes affecting large portions of cities and entire towns with dispersed non-combatants. Collateral damage is expected to be at a minimum (or not at all) and aircrews are required to target threats with almost total accuracy. This level of accuracy cannot be acquired without realistic training that simulates these urban scenarios.

Security Forces missions are evolving beyond only defending airbase facilities during conflicts. Their missions have expanded to include humanitarian, force protection, and anti-terrorism actions as well. Their job, as found currently in Afghanistan, Pakistan, and Uzbekistan, is to ensure that airbases and associated facilities are secure and that U.S. and Allied air forces can undertake their combat missions. In addition, Security Forces ensure that supplies are delivered (from aircraft such as the C-130s and C-5s) to airbases in a safe and secure environment, protected from hostile incursions.

## 1.4 PURPOSE FOR THE NEVADA TRAINING INITIATIVE

Congress, in the National Defense Authorization Act (Fiscal Year 2000), expressed its concern that U.S. military services have not sufficiently emphasized urban warfare training. Meeting operational requirements for missions in these urban environments present a set of challenges to the Air Force that need to be addressed through training in realistic, variable contexts. By investing in better and more appropriate training facilities, technologies, and education the Air Force can generate substantial advantages over enemies in an urban terrain while avoiding civilian loss of life, damage to humanitarian missions (e.g., medical and aid facilities and religious centers), and destruction of private property. In addition, Security Forces need to be prepared to respond to terrorist or small commando assaults on airbase environments with little or no collateral damage or civilian loss of life in both wartime and peacetime missions.

The purpose of NTI is to fulfill the Air Force need to train aircrews and Security Forces in a modern urban environment at NTTR. NTI would implement two proposed actions. Proposed Action One would establish and operate a HTTC consisting of integrated, realistic targets and assets which simulate an urban environment for aircrews at one of two locations in the South Range. Proposed Action Two would construct and operate a MOUT at Range 63A that realistically simulates an airbase environment and construct facilities and infrastructure to support Security Forces training at one of two locations in Indian Springs.

***Proposed Action One***. The HTTC would be designed for flexibility and ease of modification to meet varying combat scenarios. These assets would be placed in a manner and large enough to simulate a city center. The simulated buildings could be modified to change the view seen by the aircrews. This would provide variable scenarios and lessen the ability of aircrews to become accustomed to particular missions.

To further increase realism, a moving convoy would travel on a road leading to and from the HTTC. The complex and moving convoy would be integrated with a system of threat emitters to present a more realistic scenario to aircrews as they undertake their combat mission. To accurately score aircrew success, the existing system would be updated and linked with the HTTC, moving convoy, threat emitters, and other NTTR target assets to provide instantaneous feedback to better train and inform aircrews during their combat training missions. Enhancement of other scoring systems (e.g., North Range assets) within the NTTR would provide overall consistent, training feedback.

***Proposed Action Two***. Developing and operating an urban airbase facility, capable of training Air Force Security Forces in a realistic environment, forms the purpose of the MOUT. Facilities that can adequately accommodate the Security Forces and support current technology for teaching and evaluating student success are also crucial to the purpose of creating the MOUT and associated facilities.

## 1.5 NEED FOR THE NEVADA TRAINING INITIATIVE

***Aircrew Training in an Urban Environment***. Under urban combat scenarios, aircrews flying different types of aircraft, with differing missions, need to identify and destroy a variety of defined targets while facing myriad threats. These varying types of aircraft include the helicopters and their special operations; low-altitude A-10s and AC-130s and their associated weapons systems; medium-altitude fighter jets such as the F-15s and F-16s and their ordnance capabilities that include precision-guided munitions; the high-altitude bombers such as the B-52s, B-1s, and B-2s and their precision-guided munitions, as well as the reconnaissance and intelligence gathering aircraft like the E-8s, E-3s, and Unmanned Aerial Vehicles (Predators and Global Hawks).

Potential target types vary considerably, and can change daily depending upon the nature of the conflict. The varying targets can include airfields or airplanes, communication facilities, radars, anti-aircraft artillery (moving and stationary), roads, fuel depots, bridges, railroads, trains, convoys, buildings, and even specific rooms. Ground-troop concentrations and armor (e.g., tanks) also form important targets. These targets can be located within cities, on major railways or highways, adjacent to hospitals, near rivers, or in the middle of deserts. Aircrews face various threats as well when approaching and departing these targets including anti-aircraft artillery (AAA), surface-to-air missiles (SAMs), and man-portable air defense weapons. As encountered in Kosovo, targets may be well camouflaged, revetted, or surrounded by decoys.

Given the variability in situations, missions performed in urban environments may involve the range of aircraft in the Air Force inventory and a great variety of target types and conditions. For example, a mission could require a bomber to accurately deliver a single munition into a specific portion of a building while avoiding a hospital in the area. Or, a mission could require an A-10, F-16, or F-15E to attack a convoy harboring terrorists attempting to enter a town and hide among the populace.

To meet the challenges of these missions, aircrews need to train against realistic target complexes. Currently, NTTR provides limited components of this urban training throughout the ranges. The training areas consist of static targets, made of concrete blocks, ocean containers (similar to railroad box cars), or other building materials. Target complexes of this type at NTTR usually cover less than 10 acres and do not have realistic configuration and spacing of buildings. These target areas lack both the realistic appearance and complexity of actual urban settings that require aircrews to achieve "surgical" accuracy. Existing target areas are dispersed throughout approved ranges in NTTR but are not:

- large enough to adequately accommodate a variety of targets to simulate a realistic urban setting,
- configured and spaced to reflect the challenges of urban targeting,
- complimented with mobile targets that simulate the important components of urban settings, and
- quickly adaptable or flexible to change scenarios to challenge aircrews and aircraft in the range of missions possible in an urban environment.

In addition, threat emitters are not thoroughly integrated throughout the ranges to provide the complexity of threats aircrews might encounter during a mission, nor are the scoring sites sufficiently linked with these threats and targets to provide the instantaneous feedback needed to improve aircrew performance.

***Security Forces Training in an Urban Airbase Terrain.*** The Security Forces must maintain a secure environment at airbases by detecting and engaging enemy forces that threaten sustained air operations. Hostile occupation of an air traffic control tower or wing headquarters could effectively terminate aircraft operations and affect the execution of missions throughout a theater of operations. Security Forces are charged with the mission of defending and, if necessary, recapturing occupied facilities on airbases. Typical facilities on an air base include a runway, control tower, operations and headquarters buildings, hangars, logistics support facilities, and streets.

Threats to airbases can range from highly sophisticated combat troops with armor and helicopter support to less sophisticated insurgent or terrorist forces. Security Forces must train for all possible situations and contingencies using realistic, modern facilities.

Existing facilities at NTTR (Range 63A) represent the only site for training Security Forces currently available in Air Combat Command. However, the training area and infrastructure supporting Security Forces at NTTR are inadequate in terms of efficiency, technology, complexity, and realism. They fail to offer a realistic airbase environment. Presently, Security Forces undertake their classroom, field training, and lodging at three separate locations. The field training for military operations in an urban terrain occurs at the existing MOUT facility within Range 63A. However, the MOUT is over 17 years old, constructed of cinder blocks, and simulates a sparse village environment rather than an urban airbase setting. The buildings are only 2-stories, and lack adequate stairs, roofs, or hallways. The limitations of the existing MOUT prevent the Security Forces from negotiating realistic, multiple floor structures, working in a dark environment (roofless buildings allow light inside buildings), or moving through a maze of small hallways (normally found in modern buildings). In addition, the existing MOUT facility lacks any airbase infrastructure such as a simulated runway, control tower, hangars, operational facilities, and streets to adequately mimic the urban airfield environment. The existing site does not contain live fire capabilities or data-recording instrumentation such as cameras, sensors, and speakers. These capabilities are vital to effective training and post-exercise feedback that enable security forces to correct critical training deficiencies, saving lives during real-world operations.

Classrooms are spread out over three locations (Range 63A, Point Bravo, and ISAFAF), outdated, and/or unable to accommodate current technology. The classroom at Range 63A is over 10 years old and the site at Point Bravo is about 18 years old; the small classrooms at ISAFAF were constructed in 1999.
To accommodate the 230 students, 160 instructors, ten times per year—for a total of about 2,300 students and 1,600 instructors per year (Air Force 1997a)—the personnel are currently shuttled back and forth to multiple classrooms and equipment is stored at different locations. Movement of students, instructors, and equipment between locations wastes valuable time and resources. Other facilities to support the expanded mission of the Security Forces, such as kennels for military working dogs and areas to accommodate their trainers and training, are non-existent; current lodging and dining facilities, to support the 2,300 students and 1,600 instructors per year, are not available due to the large class size and other mission requirements at ISAFAF.

# CHAPTER 2

# DESCRIPTION OF PROPOSED ACTIONS AND ALTERNATIVES

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# DESCRIPTION OF THE PROPOSED ACTIONS AND ALTERNATIVES

This chapter describes the Nevada Training Initiative (NTI) and the proposed actions and alternatives that would meet the defined needs. The overarching NTI proposal is to implement two separate proposed actions. Each distinct proposed action would establish an integrated and linked set of assets that realistically simulate modern urban warfare for Air Force aircrews (Proposed Action One) and airbase combat scenarios for Air Force Security Forces (Proposed Action Two) at NTTR. Proposed Action One would establish a High-technology Test and Training Complex (HTTC), associated moving convoy and maintenance center, scoring sites, communication command center, fiber optic cable and communications lines, powerlines, and threat emitters to realistically simulate an urban environment for aircrews conducting training at NTTR. Proposed Action Two would establish a modern, simulated urban airbase environment (MOUT) for the Security Forces as well as associated classrooms and infrastructure to support their training.

The Air Force identified (see Section 2.1 below) three alternatives for Proposed Action One (Figure 2-1): two action alternatives and the no-action alternative. Alternative 1A would locate the HTTC on Range 64 (South Range) of NTTR. Alternative 1B would place the HTTC on Range 62 (South Range) of NTTR. Each action alternative would meet the operational requirements and need presented in Chapter 1. Alternative 1C, as required under CEQ regulations (40 CFR 1502.14 (d)), is the no-action alternative where the HTTC and associated facilities and infrastructure would not be developed.

Proposed Action Two, the MOUT training facility, also has three alternatives—two action alternatives (2A and 2B) and the no-action alternative (2C). The MOUT training facility would be at the same location under both action alternatives; it would be constructed and incorporated into the existing Security Forces training area on Range 63A within NTTR. The locations of associated facilities (i.e., academic, lodging, dining, and kennel facilities) differentiate Alternatives 2A and 2B. Either action alternative would fulfill the need for the training facility. Under the no-action alternative, 2C, no changes to existing facilities or new construction would occur.

The Air Force completed the environmental analysis for Proposed Action Two (MOUT), and a Finding of No Significant Impact (FONSI) was signed on August 8, 2002. The public was notified of the decision through newspaper media and the FONSI made available to interested individuals, government agencies, and public libraries.

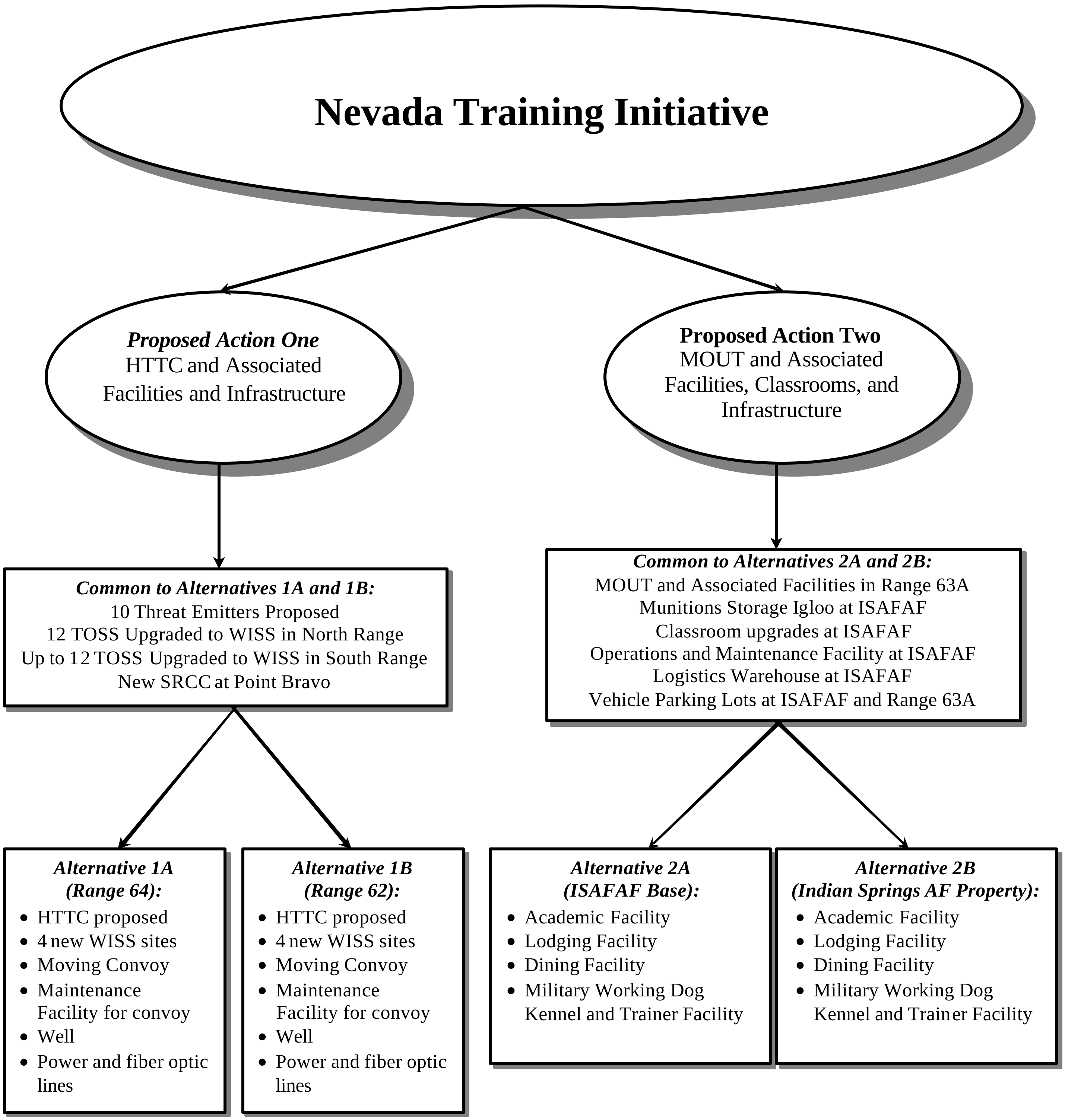


**Figure 2-1 NTI Proposed Actions and Alternatives**

## 2.1 ALTERNATIVE IDENTIFICATION PROCESS

Identification of alternative locations for Proposed Action One and Proposed Action Two involved two separate efforts. First, the operational and infrastructure elements needed to support realistic urban training for U.S. and Allied aircrews (Proposed Action One) were examined by the Air Force and alternative locations identified to meet these requirements. In the second and separate effort, review of Air Force Security Forces (Proposed Action Two) mission requirements led to identification of alternatives.

### 2.1.1 Proposed Action One (HTTC) Alternative Identification Process

Conducting operations against an urban environment represents an emerging requirement for aircrews. Combat experience over the past decade has revealed the important factors associated with an urban training environment for aircrews:

- ***Variety, breadth, and flexibility of targets.*** In combat, targets located within urban environments may change rapidly and a wide array of structures and locations may have military significance. To provide realistic training to aircrews, a complex must be large enough to accommodate the variety, breadth, and flexibility of target types that could be encountered. Table 2.1-1 provides a summary of the target types, their attributes and characteristics, and training activities they support. These targets must be constructed to offer a realistic view from the air and allow for quick, easy alteration to present different challenges.
- ***Configuration of target complex.*** An urban target complex not only needs to be large enough to accommodate a range of targets, it must also be large enough to permit realistic configuration of those targets. Aircrews need to distinguish among targets and those structures not associated with a conflict. As combat experience has demonstrated, targets can be located near structures where collateral damage should be avoided. In contrast, a realistic arrangement of the urban environment is also important (e.g., placing warehouses near rail or water transport facilities).
- ***Threat Environment***. Urban environments, with their essential communication and transport capabilities, represent significant assets worthy of defense. Realistic training in the urban environment must include the range of ground-based threats that aircrews could encounter in combat (refer to Table 2.1-1). These threats need to simulate tracking and targeting radars,

surface-to-air missiles, anti-aircraft artillery, and other threats. They must be configured and positioned to provide defense-in-depth, both near the urban target complex and away from it.

- ***Training Feedback***. To meet the challenges of combat operations in an urban environment, aircrews need rapid and accurate feedback during training. Accuracy is vital during ordnance delivery in an urban environment; achieving such accuracy is a direct result of receiving feedback on aircrew training performance. Sophisticated scoring facilities with links to aircrew debriefing stations provide such feedback. Scoring facilities need to be situated to provide full coverage of the training complex.

**Table 2.1-1 Urban Combat Requires Realistic Training**

| *Target/Threat* | *Attributes/Characteristics* | *Training Activities* |
|---|---|---|
| Urban Environment | Administrative and Support Buildings (e.g., multi-storied, heated/unheated military, political, communication, command and control facilities, power stations) | High and/or low-altitude navigation; high and/or low target acquisition and attack; multi-aircraft attack coordination; non-target avoidance; ordnance (actual and simulated) delivery; use of electronic countermeasures; course deviations; airspeed changes; communication; aircraft maneuvering; integration with ground crews for close air support; infrared sensor training |
| | Railroad Station | |
| | Humanitarian Buildings (multi-storied hospitals, schools, sports fields, churches, mosques) | |
| | Office Buildings (multi-storied warehouses, fuel depots) | |
| | Dwellings (multi-storied) | |
| | Roads (lit/unlit, paved/unpaved) | |
| | Bridges | |
| | Airfields (runways, control tower, parked aircraft, administrative buildings) | Offensive/defensive tactics against infrastructure supporting enemy aircraft |
| Moving Convoy | Vehicles (cars, tanks, trains) | Moving target identification and acquisition; inert ordnance delivery; varying scenarios |
| | Track/Road | |
| | Open space (e.g., open landscape) | |
| | Closed space (e.g., city scape) | |
| Threats | Threat and tracking radar | Avoidance, defensive countermeasures, targeting and neutralization |
| | Defensive Weapons within urban environment | Defensive tactics against ground threats: anti-aircraft-artillery, missiles, man-held portable weapons, obscurants |
| | Defensive Weapons outside urban environment | |

Currently, available assets at NTTR have numerous limitations affecting the ability to support realistic urban training for aircrews. Existing assets do not offer the variety and breadth of targets to adequately simulate realistic, urban targets for the variety of aircraft and their missions conducting training at NTTR.

In addition, the simulated threat environment (i.e., emitters) and scoring systems to provide performance feedback to aircrews are neither configured nor updated to meet training needs for an urban environment.

NTTR includes hundreds of targets of different types but they do not meet the needs or requirements of an urban training complex. These many targets are dispersed over numerous subranges within the roughly 2.9 million-acre NTTR. No current target areas present a realistic urban combat environment in terms of variety of targets, size, or configuration capability. None of the existing target areas cover more than 10 acres (i.e., no more than two city blocks), and none offer the complexity of arrangement inherent in an urban environment. The composition of these target areas limits flexibility of arrangement and appearance, and they lack most of the attributes of an urban training complex (refer to Table 2.1-1). These existing target areas also lack adequately configured threat emitters and linked ordnance-delivery scoring facilities. In addition, there is no single target complex that can accommodate the package of aircraft undertaking urban combat missions at the same time at the same place. For example, helicopters undertake their operations in one location; low altitude A-10s expend ordnance in another place; F-15s conduct their training missions at yet another location; and the B-52s conduct ordnance delivery at another site. In actual combat, these aircraft have their respective roles but work in a carefully executed sequence (or in a package) to successfully fulfill their missions.

These limitations at NTTR preclude use of existing target complexes for an urban combat training environment. Based on the training needs and factors derived from combat experience, the Air Force defined the components of an urban combat training environment:

- a HTTC that has infrastructure capable of realistically simulating a city environment;
- a moving convoy to simulate vehicles traveling along roads and in different directions;
- threat emitters located so as to properly emulate defense-in-depth ground threats to aircraft; and
- scoring systems within and adjacent to the HTTC, as well as in the general area, to quickly evaluate aircrew performance during ordnance delivery.

To identify suitable alternative locations at NTTR for the HTTC and associated facilities, the Air Force defined criteria based on the size, configuration, and arrangement of the components. Suitable alternative locations must be:

1. large enough to adequately simulate an urban city center—approximately 640 acres in size;
2. located close enough to Nellis AFB to allow aircraft with both long (e.g., bombers) and short (helicopters) range capabilities;
3. placed in an area that could allow for ingress (attack) and egress (departure) from various directions; and
4. flexible and adaptable to vary combat scenarios for use by different aircraft and their associated missions.

Two potential locations within NTTR (North and South Ranges) were considered for the HTTC and associated infrastructure alternatives. The Air Force evaluated the North Range and it met three (1, 3, and 4) of the four criteria. However, the North Range is too distant from Nellis AFB to meet criterion 2, and could not be considered a reasonable alternative. Certain aircraft (e.g., helicopters) would not be able to efficiently undertake combat missions if the HTTC were located in the north. The aircraft do not carry enough fuel to allow them to fly to the HTTC, undertake their mission, and return to Nellis AFB without the use of refueling. In contrast, two locations within the South Range, Range 64 and Range 62, fulfilled all four criteria. These two locations met the criteria to support establishment of the HTTC and associated infrastructure. Both sites can support a 640-acre complex within the existing ordnance delivery impact zones; are close enough to Nellis AFB to support multiple aircraft with differing missions; allow for ingress and egress in various directions; and would allow construction equipment to use existing roads to build the flexible complex needed for varied combat scenarios. In addition, existing targets at either alternative location could be used in conjunction with the HTTC, thus expanding the complexity and variability of combat training scenarios.

The location for the proposed HTTC in Range 64 lies within a defined impact zone that has been used for several decades for air-to-ground ordnance training. This impact zone contains tactical targets such as tanks, convoys (static), and simulated anti-aircraft artillery missile sites. Similarly, the proposed HTTC site in Range 62 falls within a long-established ordnance impact zone that contains targets consisting of an airfield, bomb circles, supply area, convoy (static), and anti-aircraft artillery missile sites. Training within both of these impact zones includes the full spectrum of ordnance authorized at NTTR, including live (explosive) munitions. Both sites support some existing threat emitter and scoring sites, and existing roads provide access.

### 2.1.2 Proposed Action One Alternatives

Proposed Action One would involve construction and operation of a HTTC, moving convoy, 10 threat emitters, up to 28 scoring sites, and associated infrastructure (e.g., roads, cables) that would simulate a modern urban target complex with sophisticated ordnance delivery scoring.

Two action alternatives, 1A and 1B, are centered around construction of a HTTC at Range 64 (Figure 2-2) and Range 62 (Figure 2-3), respectively. Including the HTTC, each alternative would consist of several components (Table 2.1-2):

- HTTC – An approximate 640-acre HTTC would be constructed and operated at either Range 64 (Alternative 1A) or Range 62 (Alternative 1B).
- Threat Emitters – A total of 10 threat emitters (from a possible 20 locations) would be established at sites within the South Range to support training operations associated with the HTTC. Most (18 out of 20) possible locations consist of existing sites that would require upgrading only.
- Scoring System – As many as 24 Weapons Impact Scoring System (WISS) sites (12 in the North Range and up to 12 in the South Range) would be developed by upgrading existing, but outdated Television Optical Scoring System (TOSS) sites. Upgrading of 12 TOSS sites in the North Range would enhance overall training feedback consistent with the improvements resulting from establishment of the HTTC and associated facilities in the South Range. While these 24 sites would be the same under either action alternative, four additional new WISS sites are proposed per alternative (for a total of 28 WISS sites). These WISS sites would be within or adjacent to their respective HTTC.
- South Range Control Complex – Under either Alternative 1A or 1B, the Air Force proposes to demolish an existing building at Point Bravo's SRCC (in the South Range) and construct a new, upgraded command, control, and communications center in the same area.
- Water Well – Rather than trucking water over extensive distances to support construction activities, the Air Force would construct a well using existing, permitted rights. This well would be placed in proximity to the HTTC location, depending upon the alternative selected.

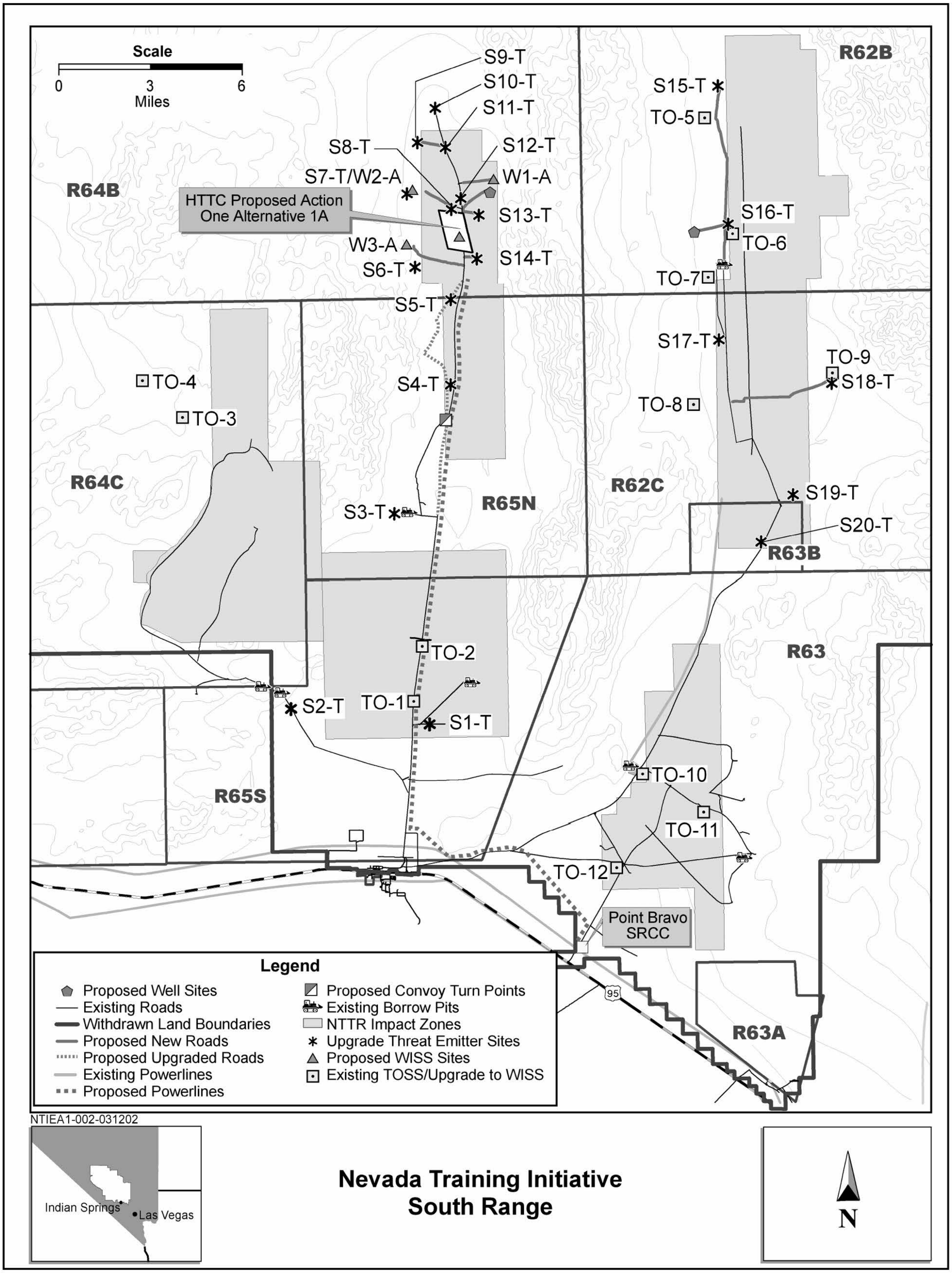


**Figure 2-2 Proposed Action One, Alternative 1A**

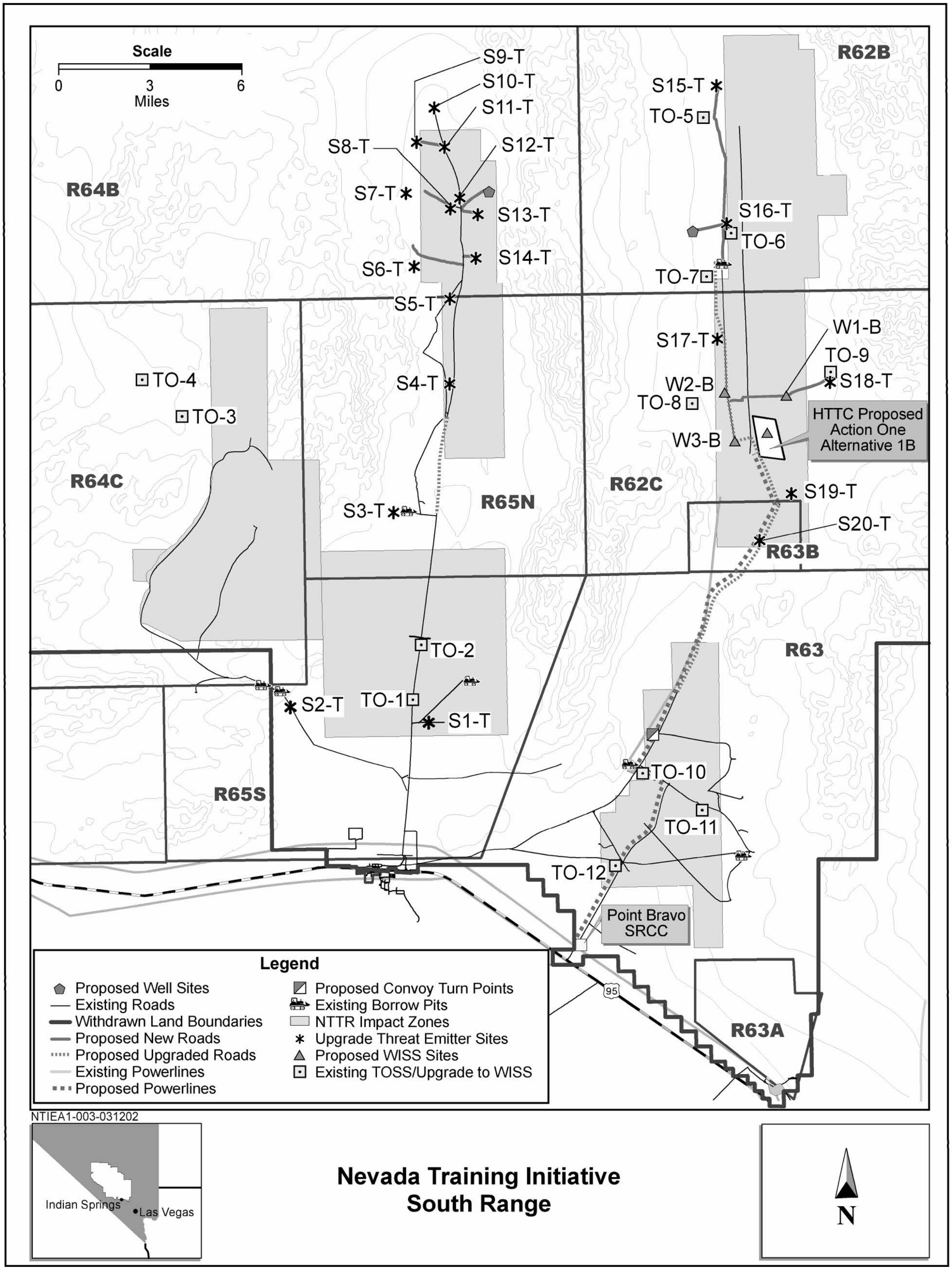


**Figure 2-3 Proposed Action One, Alternative 1B**

- Roads, Power, Fiber Optic Cables – The Air Force requires access, power, data exchange, and communication connectivity with the other components of the HTTC, emitters, and scoring sites. For both action alternatives, the majority of the roads that would be used consist of existing roads that would be upgraded. Powerlines and cables would coincide with the roads. Some segments of the power lines may be mounted on above-ground poles with the remainder consisting of buried cable.

Other aspects of the action alternatives (described below) include the use of the HTTC by aircrews for urban combat training and ground maintenance operations.

**Table 2.1-2 Proposed Action One Components**

| ***Components*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Description*** |
|---|---|---|---|
| HTTC | Range 64 | Range 62 | Approximate 640-acre simulated urban target complex |
| Moving Convoy | Range 64<br>Up to 8 miles | Range 62<br>Up to 10 miles | Graveled road adjacent to existing road |
| New WISS Sites | 4 locations associated with Range 64 HTTC | 4 locations associated with Range 62 HTTC | 1-acre sites, 3 adjacent to the HTTC and 1 inside HTTC |
| Threat Emitter Sites | Up to 10, 1-acre sites chosen from across the South Range from a possible 20 locations | | |
| Existing TOSS Sites converted to WISS Sites | Up to 24, 1-acre sites; twelve 1-acre sites in the North Range and up to twelve 1-acre sites in the South Range | | |
| Water Well | Use existing permit | Use existing permit | 1-acre site to support construction activities |
| New Roads/Power/Fiber Optic Cables | About 12 miles | About 12 miles | New construction or major upgrades |
| Existing Roads/ Power/Fiber Optic Cables | About 36 miles of existing roads, no matter the alternative, would be upgraded | | |
| SRCC | One 7,500 square-foot facility at Point Bravo in the South Range; replaces existing facility | | |

***Proposed Action One Components***

**High-technology Test and Training Complex.** The HTTC, under either Alternative 1A or 1B, would be approximately 640 acres in size and be composed of structures, roads, and a moving convoy simulating a modern urban environment (e.g., government headquarters, religious centers, factories, homes, and office buildings). There would also be a rail yard, river (no water), and bridges as well as other infrastructure that would realistically simulate a modern, urban city environment found in a variety of geographical locations. Figure 2-4 provides a schematic of how this HTTC would appear for aircrews conducting combat training.

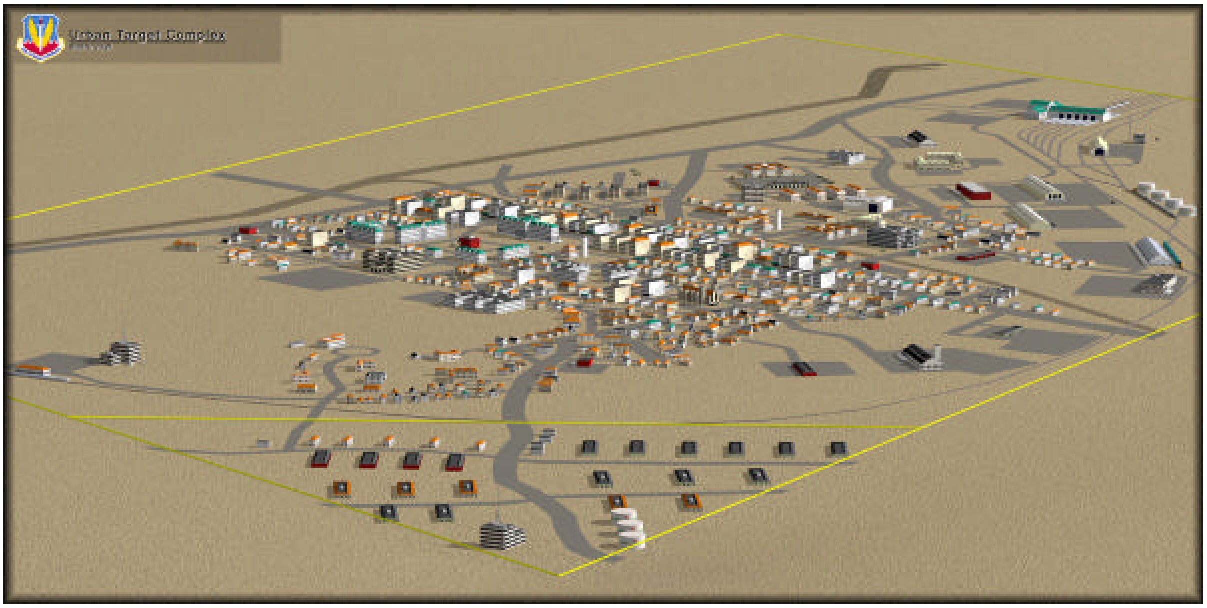


**Figure 2-4 A HTTC Provides a Realistic, Urban City Environment**

To construct the HTTC, grading, trenching, and other standard practices would be used. Some portions of the complex would also be paved to simulate realistic conditions. The structures within the HTTC would be of a modular type (Figure 2-5) and constructed of inexpensive yet durable materials (e.g., aluminum) and placed on concrete pads or affixed to footings. The modules would be prefabricated and prepainted at the factory and be easily transportable over roads. They would include simulated windows, doorways, and other entry points to use for targeting accuracy training. They would be assembled in desired shapes at the complex to form an urban environment suitable for training aircrews in target location, identification, and destruction using precision weapons and associated tactics. Some of these structures would house electric heaters to provide heat signatures for training with infrared targeting.

**Figure 2-5 Buildings Need to be Flexible and Variable**

Devices to release obscurants such as foggers and smoke may be installed in some structures and employed by remote control from the SRCC at Point Bravo. These obscurants would provide various conditions for aircrews when targeting structures.

To increase realistic modern urban training, a moving convoy would also be constructed. The moving convoy is considered one of the most challenging target features of the HTTC. The convoy would travel along approximately 8 to 10 miles of road, to and from, as well as within, the HTTC. The convoy would use a remotely-operated diesel powered tractor-type vehicle to pull four to six target vehicles along a track (similar to a monorail). Circular turnarounds at each end of the roadway would be used to reverse its direction. At the turnabout, south and outside the HTTC, the Air Force would construct a maintenance and storage structure for the convoy. The convoy would:

- move at about 15 miles per hour along a road to and from the HTTC (about 8 to 10 miles) as well as within the HTTC (about 2 miles) during the time the HTTC was operational;
- provide a suitable target for both training (non-explosive) ordnance and electronic ordnance-delivery;
- be scorable (by multiple scoring systems) to attacks throughout its journey along the road and within the HTTC; and
- present a moving target for space and information warfare systems training during large force exercises.

**Figure 2-6 WISS**

**Scoring Systems.** To provide the necessary feedback to aircrews on their performance during training against an urban environment, the Air Force would establish and/or upgrade scoring systems. A primary component of the scoring system is the one-acre WISS sites (Figure 2-6). Under either action alternative, a total of up to 24 existing sites would be converted from TOSS equipment to WISS: up to 12 would be upgraded and replaced in the North Range (in Ranges 71S, 75, and 76) (Figure 2-7) and about 12 in the South Range (Ranges 62, 63, and 65 [refer to Figure 2-2 and 2-3]). Site upgrades in the North Range would provide enhancement of overall scoring feedback consistent with that offered by the HTTC and other proposed facilities in the South Range. Neither the total number nor the specific locations of these sites would be linked to either Alternative 1A or 1B. Any combination of up to 24 sites would meet the operational needs for training. In contrast, four (three adjacent to the HTTC and

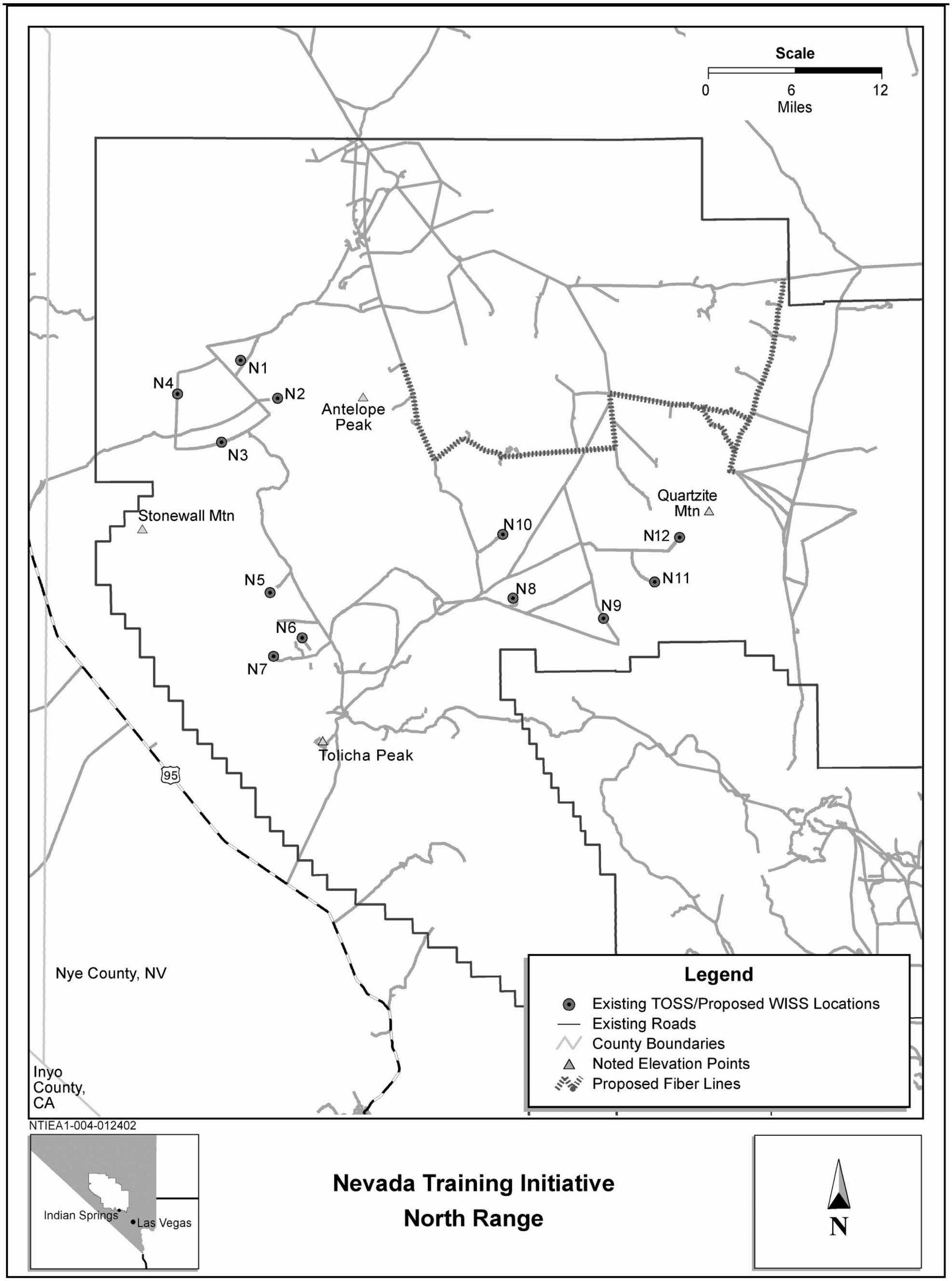


**Figure 2-7 Existing North Range TOSS Sites to be Converted to WISS Sites**

one inside) distinct new WISS sites are associated with each of the alternatives and would be constructed either one of the two alternative HTTC locations. All WISS sites would be integrated into the overall system by fiber optic cables and controlled from the Point Bravo SRCC site under either action alternative.

In addition to the WISS sites, an array of high-technology scoring systems would be employed within the HTTC to score the various targets. These scoring systems would be housed in facilities similar to the WISS or on metal-pole towers and are part of the Joint Advanced Weapon Scoring System. They include: Improved Remote Strafe Scoring System, Laser Evaluator System–Mobile, Large Scale Target Sensor System, and Imaging Weapons Training System. To support realistic military operations in an urban environment, all the systems would be installed within the 640-acre HTTC under either alternative. Interconnected by fiber optic cables allowing for control from the SRCC at Point Bravo, these systems would permit monitoring of actual (inert) and simulated ordnance delivery.

**SRCC.** For either Alternative 1A or 1B, the Air Force would construct a 7,500 square-foot building at the existing Point Bravo installation (i.e., entrance to the South Range). This SRCC building would house all monitoring, control, and communication equipment for the proposed HTTC, convoy, emitter sites, scoring systems, and security devices. Demolition of the old installation would occur after construction of the new facility.

**Threat Emitter Sites.** To provide realistic threats for training, the Air Force would construct ten 1-acre sites to support mobile, unmanned threat emitter equipment that simulates various enemy air defenses as well as other combat threats. Emitter sites would consist of gravel pads with a grounding pole and minimal infrastructure. Fiber optic cable would connect these sites to the Point Bravo SRCC for operation and monitoring.

**Figure 2-8 Representative Threat Emitter**

The Air Force has identified 20 candidate locations for the 1-acre sites. Under either Alternative 1A or 1B, only 10 of the sites, from both Range 64 and Range 65 would be constructed and used (refer to Figure 2-2 and 2-3).

**Water Well.** In support of construction activities, the Air Force would use existing water permits to construct a well. Located near each of the HTTC locations in Alternative 1A (refer to Figure 2-2) or Alternative 1B (refer to Figure 2-3), the well would provide water only during periods of construction and occasional road maintenance.

**Roads, Commercial Power, and Fiber Control Cable.** About 48 miles (up to 36 miles of existing and 12 miles of new roads) of roads or commercial power and/or fiber control cable would be constructed under either action alternative. For upgraded roads, the disturbance would be generally confined to existing road corridors. These roads, commercial powerline, and fiber control cable would provide vehicle access, electricity, and control signals to WISS and other scoring sites, emitters, as well as associated infrastructure. To minimize disturbance and to enhance construction efficiency, the roads, powelines, and cables would be placed adjacent to each other along the same corridor (about 28 feet wide). About 36 miles of roads would be upgraded and up to 12 miles constructed, depending on the alternative. Both above-ground (on poles) and buried powerlines would be used and routed along the road corridors from Point Bravo to the sites. Commercial power would be drawn from existing connections to Nevada Power at Point Bravo. Commercial power would also provide a reliable source of energy to the scoring systems, existing communication vans, encryption devices, and security devices. A control network would also be established to provide data transfer capability within the entire HTTC. This control network would be composed of fiber optic cables that would be integrated with the scoring systems, emitters, and the existing control system on the NTTR. The fiber optic cables may be mounted on above-ground power poles or buried.

Proposed construction under either action alternative for the HTTC, emitters, scoring sites, Point Bravo SRCC, and supporting infrastructure would be undertaken in four sequential phases each within a year:

Phase I – Fiscal Year 2004

- Access roads, convoy track, as well as power and fiber/cable lines
- A portion of the scoring and emitter sites
- Point Bravo SRCC and convoy maintenance facility
- About a quarter of the HTTC simulated buildings/structures

Phase II – Fiscal Year 2005

- A portion of the scoring and emitter sites
- About a quarter of the HTTC simulated buildings/structures
- Access roads, power and fiber/cable lines

Phase III – Fiscal Year 2006

- A portion of the scoring and emitter sites
- About a quarter of the HTTC simulated buildings/structures
- Access roads, power and fiber/cable lines

Phase IV – Fiscal Year 2007

- A portion of the scoring and emitter sites
- About a quarter of the HTTC simulated buildings/structures
- Access roads, power and fiber/cable lines

Scheduling of construction activities would emphasize minimizing disruption of on-going training. Although some disruption would occur, it is not expected to result in changes to the amount of activity in other portions of NTTR. Table 2.1-3 provides a summary of total acres, per phase, that would support Proposed Action One activities.

| **Table 2.1-3 Proposed Action One Construction Elements** | | |
|---|---|---|
| **Phase I (FY04)** | | |
| | *Alternative 1A (acres)* | *Alternative 1B (acres)* |
| 3 Emitters | 3.00 | 3.00 |
| Convoy Road[1] | 90.21 | 138.60 |
| Point Bravo Command, Control Center | 0.17 | 0.17 |
| Portion of HTTC | 159.00 | 157.00 |
| Cable/Fiber to Point Bravo | 1.04 | 1.04 |
| Convoy Turnaround Area | 40.00 | 40.00 |
| New roads[2] | 22.80 | 32.69 |
| Existing Roads[3] | 13.46 | 39.73 |
| **TOTAL Phase I** | ***329.68*** | ***412.23*** |
| **Phase II (FY05)** | | |
| | *Alternative 1A (acres)* | *Alternative 1B (acres)* |
| 4 Emitters | 4.00 | 4.00 |
| 12 TOSS upgraded to WISS | 12.00 | 12.00 |
| Portion of HTTC | 159.00 | 157.00 |
| **TOTAL Phase II** | ***175.00*** | ***173.00*** |
| **Phase III (FY06)** | | |
| | *Alternative 1A (acres)* | *Alternative 1B (acres)* |
| 2 Emitters | 2.00 | 2.00 |
| Portion of HTTC | 159.00 | 157.00 |
| **TOTAL Phase III** | ***161.00*** | ***159.00*** |
| **Phase IV (FY07)** | | |
| | *Alternative 1A (acres)* | *Alternative 1B (acres)* |
| 1 Emitter | 1.00 | 1.00 |
| 12 North Range TOSS upgraded to WISS | 12.00 | 12.00 |
| North Range Fiber Optic Cable | 31.43 | 31.43 |
| Portion of HTTC | 159.00 | 157.00 |
| **TOTAL Phase IV** | ***203.43*** | ***201.43*** |
| **Total** | **869.11** | **945.69** |

[1] About 6 miles for Alternative 1A and about 10 miles for Alternative 1B at 120 feet wide.
[2] About 7 miles under Alternative 1A and about 10 miles for Alternative 1B at 28 feet wide.
[3] About 4 miles under Alternative 1A and about 12 miles for Alternative 1B at 28 feet wide.

***Training Activities.*** Table 2.1-1, presented previously, identifies the type of training activities that would be conducted by aircrews at the HTTC and associated facilities. Although the HTTC would provide a realistic urban training environment, the overall nature of flying operations would not change measurably from baseline conditions. Activities currently performed by the vast array of aircraft on NTTR would continue to occur, however, there would now be access to an improved urban target training capability within the HTTC. While higher altitude ingress and egress to the HTTC would occur from all directions, low-altitude flight would remain the same and continue to be oriented north and south between mountain ranges. Baseline annual sortie-operations[1] in the airspace (Restricted Area R-4806) over both action alternatives range from approximately 28,000 to 42,000 (Air Force 1999b). Within R64, which encompasses the HTTC for Alternative 1A, 5,827 to 8,741 annual baseline sortie-operations occur. Annual baseline sortie-operations in the R62 airspace, overlying the proposed HTTC for Alternative 1B, range from 4,581 to 6,871. The Air Force does not anticipate that establishment of the HTTC would increase sortie-operations above the upper baseline limits for the overall restricted airspace (R-4806) but could concentrate some of those operations in the airspace overlying the specific HTTC location.

Ordnance delivery training would be part of the training activities conducted at the HTTC and the associated convoy. Training would include use of electronic systems to simulate ordnance delivery targets, actual ordnance delivery using inert ordnance, as well as strafing. Portions of the HTTC would be reserved for each of these types of training. The proposed locations for the HTTC under either alternative are currently within authorized and utilized ordnance delivery impact zones. The Air Force, in establishing the HTTC, proposes no change in the nature of ordnance delivery training in the area other than to prohibit use of live (explosive) ordnance.

***Operations and Maintenance Activities.*** After completion of the HTTC and associated facilities, maintenance activities would be minimal. It is expected that maintenance for target ordnance damage assessment and repair at the HTTC would occur monthly. Maintenance of emitters and scoring systems would be more frequent, with maintenance personnel visiting each site weekly. Ordnance residue removal would follow the defined procedures for NTTR. No changes to these clean-up operations would be required.

Ground operations would occur at the Point Bravo SRCC. Currently, 25 civilian contractor personnel operate within this existing, outdated facility. With the proposed new facility, the Air Force could add up to six personnel at Point Bravo, drawing them from the existing Tolicha Peak site on NTTR.

[1] A sortie-operation is the use of one airspace unit (e.g., restricted area) by one aircraft.

**No-Action Alternative**

In conformance with CEQ regulations (40 CFR 1502.1 (d)), this EA also analyzes the no-action alternative for Proposed Action One. Under the no-action alternative (1C), the Air Force would not establish any component of Proposed Action One. No HTTC would be constructed, nor would any of its associated facilities and infrastructure. Activities, including ordnance delivery, would continue at the ranges.

### 2.1.3 Proposed Action Two (MOUT) Alternative Identification Process

To support the establishment of a MOUT complex, the Air Force identified various alternatives at NTTR. NTTR currently represents the Air Combat Command's sole location for conducting this type of Security Forces training. The current site, located at the southern tip of the South Range (Figure 2-9 and refer to Figure 1-1), includes numerous facilities, structures, and firing ranges. However, it lacks a simulated airfield and most of the associated facilities, as well as adequate infrastructure (e.g., size, computer capabilities) to teach, house, and feed trainees. Existing facilities do not offer the sophistication or realism needed for a MOUT or adequate infrastructure to accommodate the trainees.

Despite these limitations, the current location of the training facility and its vicinity comprise the only location suitable for the proposed MOUT. Other portions of NTTR either are used for activities not compatible with ground troops (e.g., ordnance delivery) or are fully committed to other missions.

The MOUT area could not be co-located with the proposed HTTC since all of the Security Forces' training involves land-based activities and their training area would be needed in a consistent manner to support 2,300 students per year. Sharing the HTTC would conflict with aircrew training that would use this area on a regular basis. Given the HTTC's location, aircrews would have priority. Traveling the distance to the HTTC and transporting needed equipment would also erode training time.

Using the basic geographical limitations for siting a MOUT and associated facilities, the Air Force applied the following criteria to define alternative locations:

- proximity to or co-location with current training facilities to take advantage of any existing infrastructure;
- ability to combine new and existing classroom locations at one site to lessen travel time and transport of equipment;

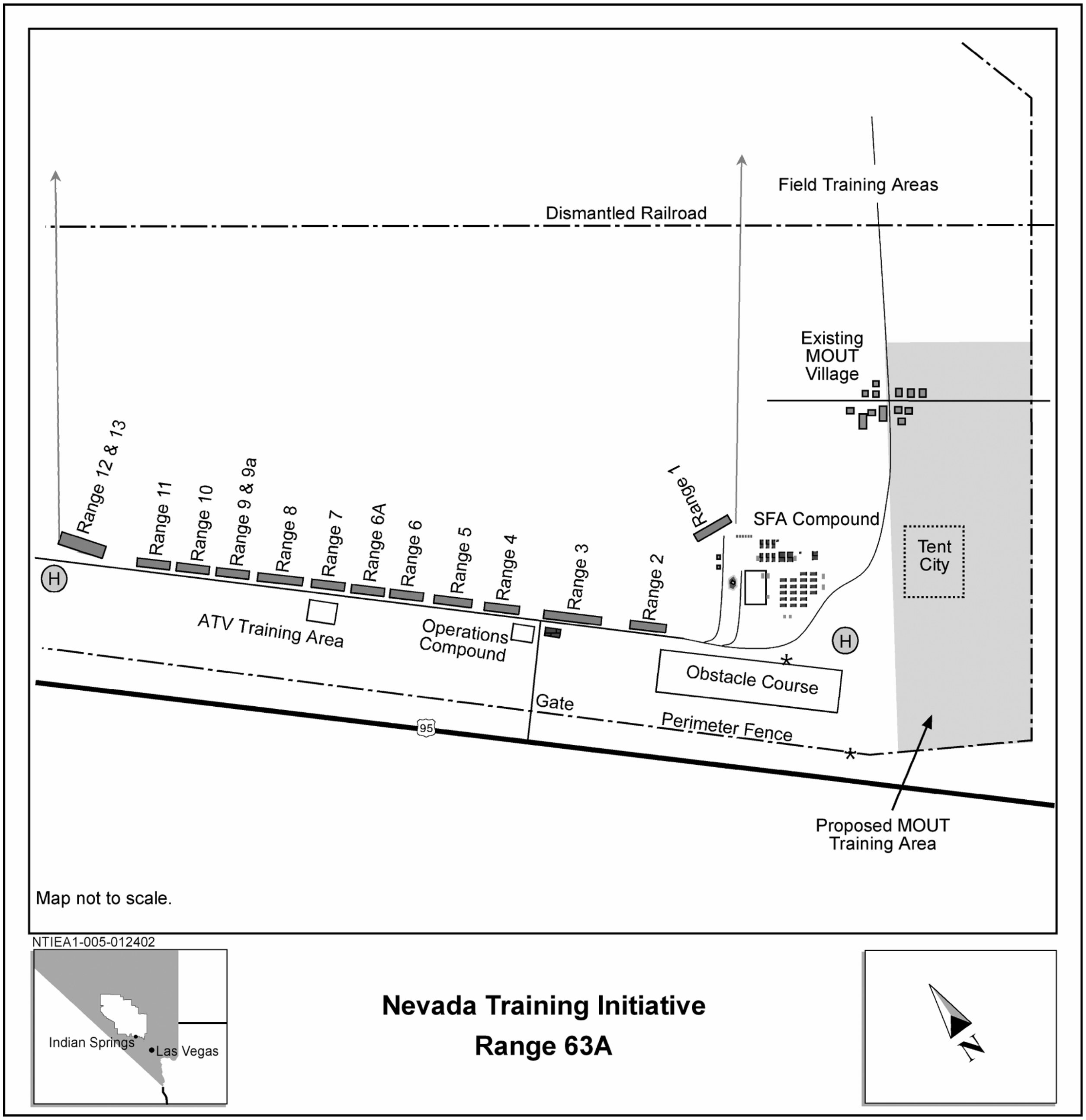


**Figure 2-9 Existing and Proposed Security Forces Training Area**

- capability to accommodate academic, lodging, and dining facilities for 230 students, 160 instructors, and 5 contractors, 10 times a year on a consistent basis; and
- capacity to offer sufficient area to construct military working dog kennels and facilities for their trainers.

To meet these requirements, the Air Force proposes to construct and operate a MOUT training complex composed of 13 permanent buildings and a control station facility (Figure 2-10) adjacent to and integrated

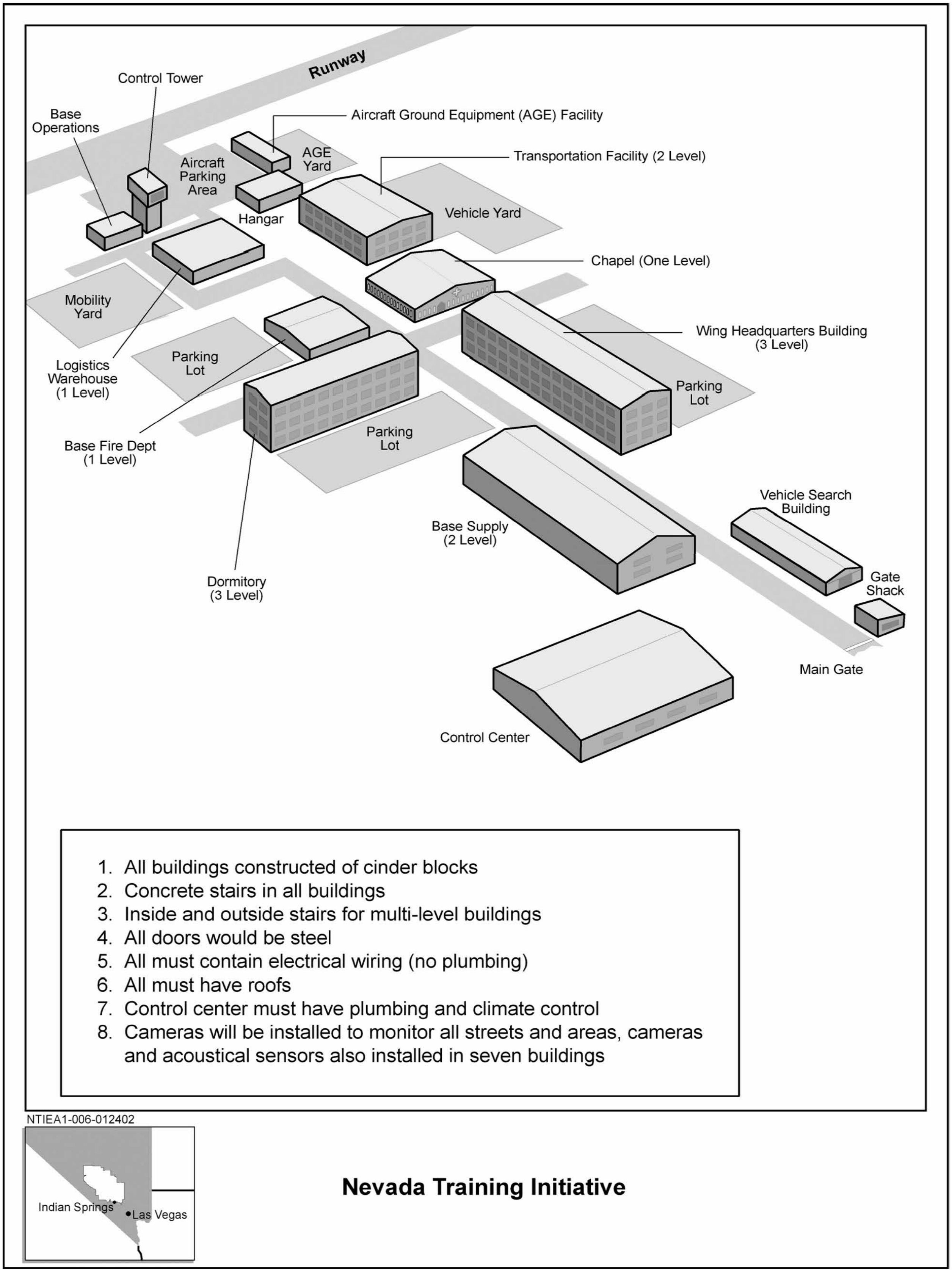


**Figure 2-10 Proposed Action Two, MOUT Complex**

with existing training facilities. Two of the new buildings would have 3 stories, two would be 2 stories, and the rest would be 1 story. All facilities (with the exception of the control center) would be live fire capable and constructed for utilization of Plastic Short Range Training munitions. These munitions disintegrate once they strike a hard surface, thus decreasing ricochet and saving wear and tear on the buildings. The MOUT training area would also have a partial simulated runway, control tower, and aircraft hangar to train for airbase protection and recapture. To simulate realistic combat conditions, blank ammunition would be used for force-on-force training, along with pyrotechnical ground burst simulators, smoke munitions, and tear gas. Buildings at the existing site used for current training would be integrated into the new MOUT complex.

To support logistics and operations, munitions storage, and classroom training, additional facilities would be constructed and existing facilities would be upgraded. New academic, lodging, dining, and military working dog (kennel and trainer) facilities would be needed as well to support the expanded training mission and provide space not easily accommodated by existing facilities. In total, the MOUT would encompass 94.3 acres; square footage for the other facilities are provided in Table 2.1-4. Construction of the MOUT and associated facilities would be phased over 5 years (Fiscal Year [FY] 2002 to 2006).

**Table 2.1-4 Proposed Action Two Facilities**

| *Facility* | *Area* | *Location* | *Scheduled Construction* |
|---|---|---|---|
| MOUT | 94.3 acres | 63A | FY05 |
| Vehicle Parking Lot | 20,000 SF | 63A | FY05 |
| Logistics Storage Warehouse | 6,000 SF | ISAFAF | FY02 |
| Munitions Storage Igloo | 1,000 SF | ISAFAF | FY03 |
| Expanded Classroom Facility | 5,000 SF | ISAFAF | FY04 |
| **Alternative 2A or 2B** | | | |
| Academic Facility | 27,990 SF | 2A or 2B | FY05 |
| Paved Parking Lot | 20,000 SF | 2A or 2B | FY06 |
| Dining/Lodging Facility | 75,028 SF | 2A or 2B | FY05 |
| Kennel/Training Facility | ~2,000 SF | 2A or 2B | FY05 |

### 2.1.4 Proposed Action Two Alternatives

Application of the criteria defined above yielded two action alternatives, both centered around the existing Security Forces training site in Range 63A and the Indian Springs Air Force Auxiliary Field (ISAFAF). Alternative 2A would involve construction of the MOUT, including the partial simulated runway, and upgrading of existing facilities at the current Range 63A training site. Since that site lacks the space and infrastructure to accommodate them, the existing operations and maintenance facility, munitions storage igloo, logistics warehouse, and parking lot at ISAFAF would be upgraded to support Security Forces needs. ISAFAF is located approximately 14 miles northwest of the existing Security

Forces training site along U.S. Highway 95. Under Alternative 2A, academic, lodging, dining, and military working dog kennel facilities would be newly constructed at ISAFAF, Figure 2-11 provides the location for this alternative.

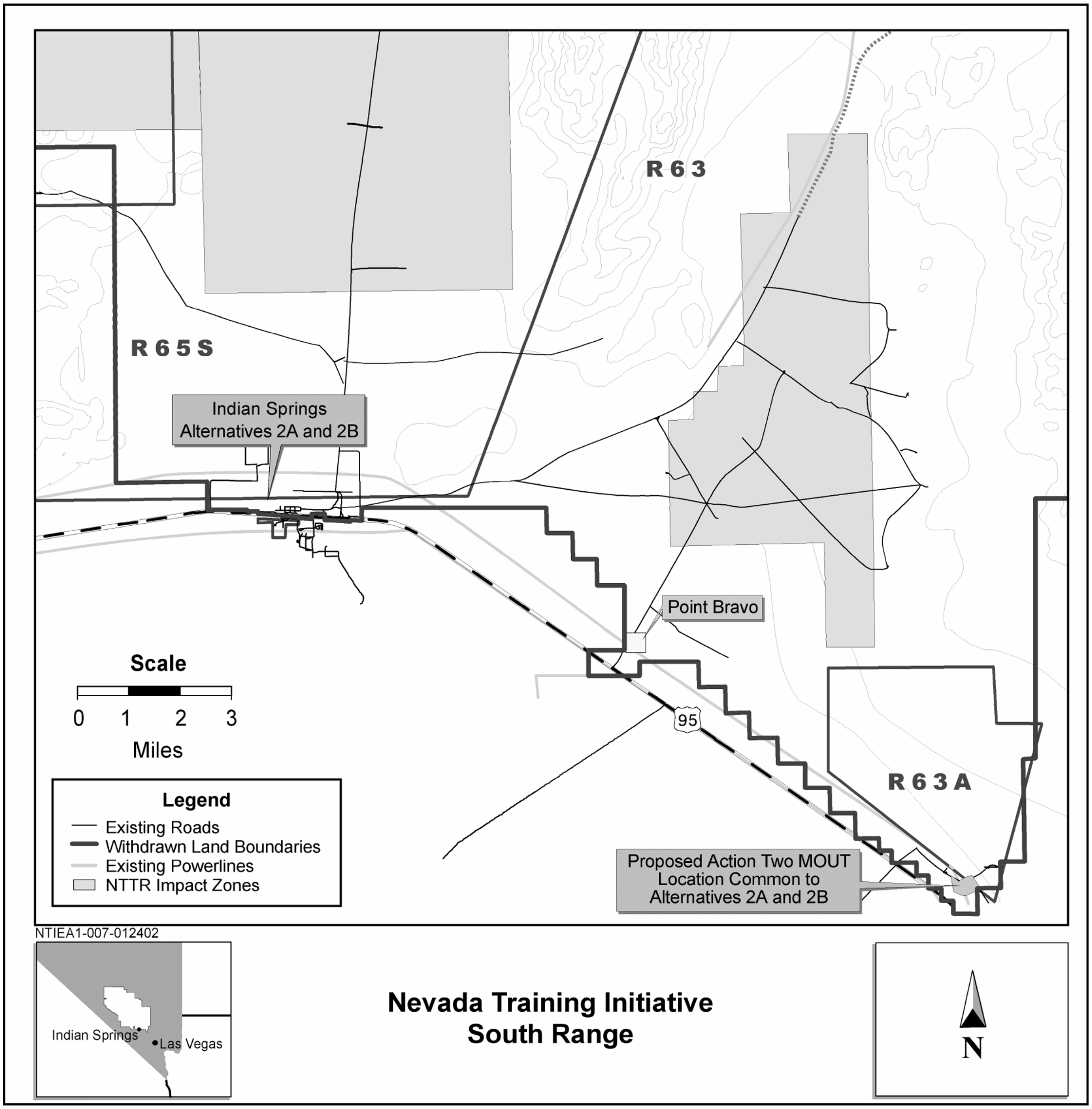


**Figure 2-11 Proposed Action Two, Alternative Locations**

For Alternative 2B, construction of the MOUT at the current training site and upgrading of existing facilities at ISAFAF would be the same as in Alternative 2A. However, construction of the new academic, lodging, dining, and military working dog kennel facilities would occur on Air Force-owned lands directly south of U.S. Highway 95, across the road from the ISAFAF (refer to Figure 2-11). Figure 2-12 provides a schematic of Alternative 2A and 2B facility proposed locations.

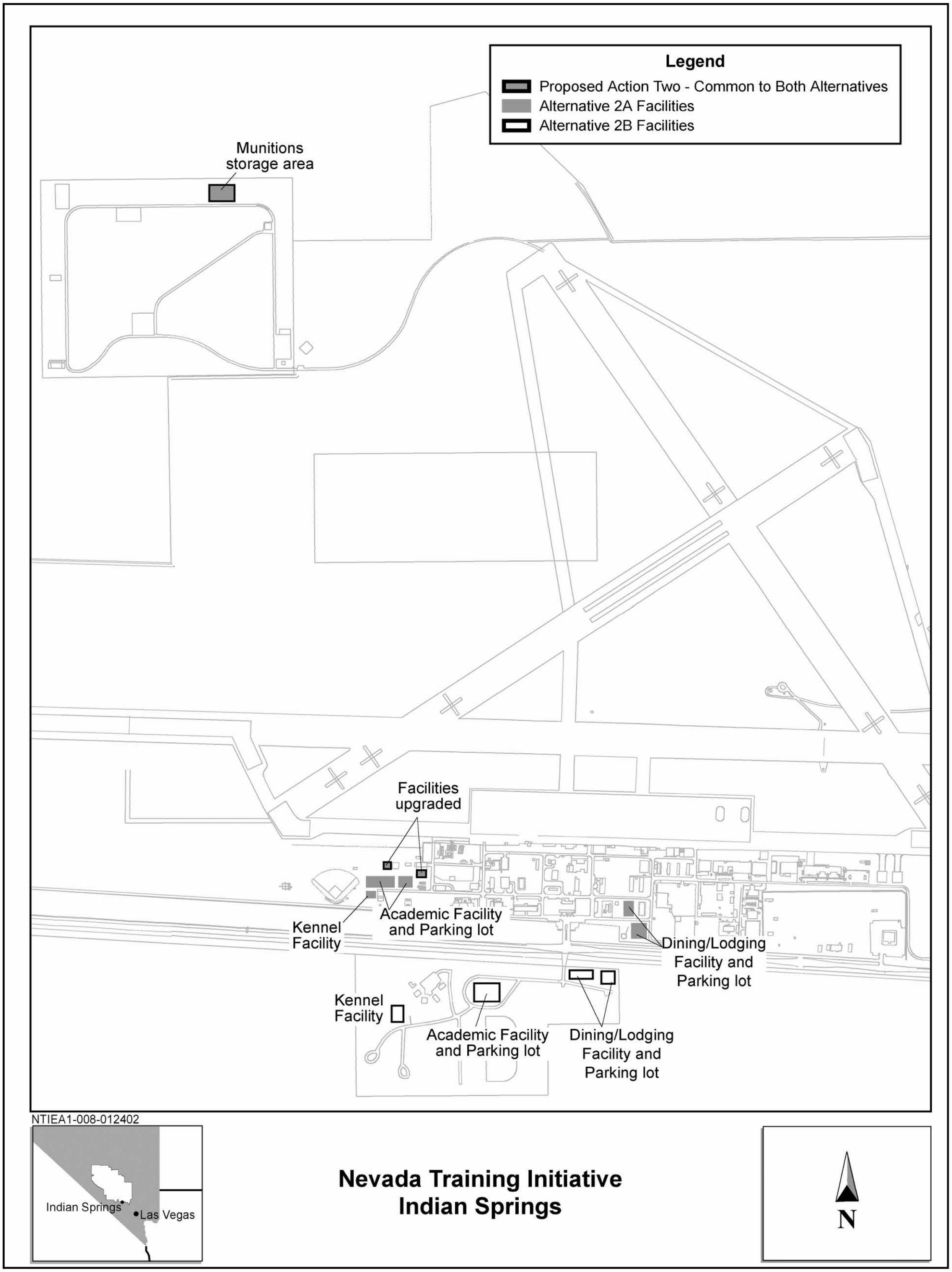


**Figure 2-12 Alternatives 2A and 2B Facility Locations**

The no-action alternative (2C) would maintain the status quo of facilities for the Security Forces. No construction or upgrades to existing facilities would be undertaken.

## 2.2 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA examines the affected environment for the Nevada Training Initiative, considers the current conditions of the two separate proposed actions and their alternatives, compares those to conditions that might occur under the no-action alternatives, and examines the cumulative impacts within the affected environment of these proposed actions as well as past, present, and reasonably foreseeable actions of the Air Force and other federal, state, and local agencies. The following steps are involved in the preparation of this EA.

1. *Conduct Intergovernmental and Interagency Coordination of Environmental Planning (IICEP).* Within this process comments are solicited from the public in the region local to the proposed action. This includes those individuals who had expressed interest in previous Nellis AFB actions, local governments, federal and state agencies, American Indian tribes, and interest groups to ensure their concerns and issues about the NTI proposal are included in the analysis. In November 2001, the Air Force sent IICEP letters to these individuals and agencies announcing the Air Force's proposed action and to request input from government agencies (see Chapter 6 for the list of people and agencies contacted and Appendix D for IICEP correspondence).

2. *Prepare a draft EA.* The first comprehensive document for public and agency review is the draft EA. This document examines the environmental impacts of the proposed actions as well as the no-action alternatives.

3. *Announce that the draft EA has been prepared.* An advertisement, in the papers local to the proposed action, will be posted notifying the public as to the draft EA's availability for review in local libraries and at a web site (www.cevp.com). After the draft EA is distributed, a 30-day public comment period begins.

4. *Provide a public comment period.* Our goal during this process is to solicit comments concerning the analysis presented in the draft EA.

5. *Prepare a final EA.* Following the public comment period, a final EA is prepared. This document is a revision (if necessary) of the draft EA, includes consideration of public comments, and provides the decisionmaker with a comprehensive review of the proposed action and the potential environmental impacts.

6. *Issue a Finding of No Significant Impact (FONSI).* The final step in the NEPA process is signature of a FONSI, if the analysis supports this conclusion, or a determination that an EIS would be required for the proposal.

## 2.3 OTHER REGULATORY AND PERMIT REQUIREMENTS

This EA has been prepared in compliance with the National Environmental Policy Act, other federal statues, such as the Clean Air Act, the Clean Water Act, Endangered Species Act, and the National Historic Preservation Act, Executive Orders, and other applicable statutes and regulations. The Air Force has initiated informal consultation with the United States Fish and Wildlife Service and with the Nevada State Historic Preservation Officer. Under either proposed action, the Air Force would need to update its National Pollution Discharge Elimination System permit for the affected areas and prepare or update the Stormwater Pollution Prevention Plans. A Surface Area Disturbance Permit, Dust Control Permit, Dust Mitigation Plan, and a Site-Specific Dust Mitigation Plan would also need to be submitted under any of the proposed actions. The Air Force would also acquire appropriate construction permits.

## 2.4 SUMMARY OF IMPACTS

According to the analysis in this EA, implementation of the proposed actions at any of the action-alternative locations would not result in significant impacts in any resource category. Implementing any of these alternatives would not significantly affect existing conditions at NTTR. The following summarizes and highlights the results of the analysis by resource category.

*Air Quality*—Individually and in combination, Proposed Action One and Proposed Action Two would result in minimal and temporary contributions to regional air emissions. Emissions would predominantly result from construction activities that would be localized in scope and spread over several years. These emissions would remain well below thresholds set by local, state, and federal air quality standards.

*Biological Resources*—Based on the dispersed locations, and relatively small size (as compared to NTTR as a whole) of the components of either proposed action, the effects on biological resources would be negligible to minimal. Many of the locations of proposed components are previously disturbed. For Proposed Action One, the HTTC locations for Alternative 1A and 1B lie within northern limits of the general region for the desert tortoise, a federally-listed threatened species. Based on evidence from previous surveys and the Biological Opinion (USFWS 2003) from the U.S. Fish and Wildlife Service, the Air Force has concluded that neither Alternative 1A nor 1B would adversely affect desert tortoise populations or species recovery. This assessment is based on the absence of critical or suitable desert tortoise habitat within the potentially affected areas, past disturbance to most of the affected locations, and low to very low tortoise populations densities within these areas. To minimize potential impacts, the Air Force would adhere to terms and conditions of the Biological Opinion (USFWS 2003).

*Cultural Resources*—Cultural resources surveys conducted for this proposal and existing data indicate that no component of either proposed action or alternatives would affect cultural resources eligible for or listed in the National Register of Historic Places.

*Soils and Water*—Overall, impacts to soils and water would be minimal. Use of Best Management Practices (e.g., grading, watering, and gravelling) during construction would minimize erosion and reduce effects on ephemeral water courses in the affected areas. Water use under Proposed Action One or Two would increase minimally and would constitute a minor amount of total capacity.

*Socioeconomics*—Within the context of the general Las Vegas area, the size and nature of socioeconomic effects associated with one or both of the proposed actions or alternatives would be negligible. For the small community of Indian Springs, a small short-term, positive effect on the local economy would result during the construction phases of Proposed Actions One and Two.

*Noise*—Since neither proposed action nor their alternatives would increase the number or overall pattern of flight activities over NTTR, aircraft noise levels would remain the same within the affected environment defined as baseline conditions. Construction noise would be localized, isolated, remote, and brief, resulting in negligible impacts to the environment.

# CHAPTER 3

# DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

# CHAPTER 3
# DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

## 3.1 ANALYSIS APPROACH

The National Environmental Policy Act (NEPA) requires focused analysis of the areas and resources (e.g., air quality) potentially affected by an action or alternative. It also indicates that an environmental assessment should consider, but not analyze in detail, those areas or resources not potentially affected by the proposal. Therefore, an EA should not be encyclopedic; rather, it should try to be succinct. This EA focuses on those resources that would be affected by the establishment of the Nevada Training Initiative (NTI) at Nevada Test and Training Range (NTTR) for the purpose of constructing and operating: 1) a High-technology Test and Training Range (HTTC) and associated convoy, facilities, and infrastructure for aircrews and 2) a Military Operations in Urban Terrain (MOUT) training area, associated facilities, and infrastructure for the Air Force Security Forces.

CEQ regulations (40 CFR Parts 1500-1508) for NEPA also require an EA to discuss impacts in proportion to their significance and present only enough discussion of other than significant issues to show why more study is not warranted. The analysis approach in this EA considers the current conditions of the affected environment and compares those to conditions that might occur should the proposed actions and alternatives be implemented. Because an extensive description of the affected environment for Nevada Test and Training Range was provided in the Nellis Renewal LEIS (Air Force 1999b), the description of such is limited in this EA and references the EIS's description extensively.

Evaluation and analysis of the potential impacts of the two separate proposed actions reveal that the major driver for potential impacts is construction of Proposed Action One (HTTC) and Proposed Action Two (MOUT), as well as the facilities and infrastructure to support the daily operation and maintenance of these proposed actions. Therefore, the affected environment for this EA centers on the site-specific locations potentially impacted by construction. Under Proposed Action One, the HTTC, convoy, its maintenance facility, emitters and scoring sites, roads, powerlines, and fiber optic cable lines, as well as the SRCC at Point Bravo, are the areas directly impacted by construction and constitute the affected environment. With the exception of Point Bravo, no new permanent employees would be based in conjunction with the HTTC. At the Point Bravo SRCC, an addition of six employees (moved from the Tolicha Peak installation) would not constitute a significant change in daily operations since 25 personnel already work there. Operations, including aircraft activities and ordnance delivery training, would not be modified outside the limits defined in the Nellis Renewal LEIS (Air Force 1999b) for NTTR. The terms and conditions of the recently rendered USFWS Programmatic Biological Opinion (BO) for activities on the South Range coincide with the Nellis Renewal LEIS and will terminate along with the range land withdrawal on March 1, 2019 (USFWS 2003). Ground operations and maintenance would also be consistent with current activities.

For Proposed Action Two, construction and training operations would define the affected environment for the MOUT, associated facilities, and infrastructure. Construction would be short-term and site specific. Students and instructors are on temporary assignment and would not be permanent employees or residents at any of the alternative locations or sites associated with Proposed Action Two. The impact of students and instructors was analyzed in the *Regional Training Area Expansion, U.S. Air Force 99th Ground Combat Training Flight Environmental Assessment* (Air Force 1997a). The affected area for Proposed Action Two would take a similar approach to that found for Proposed Action One and would consist of the sites directly impacted by construction and training.

The Air Force completed the environmental analysis for Proposed Action Two (MOUT), and a Finding of No Significant Impact (FONSI) was signed on August 8, 2002. The programmatic BO covering NTTR activities and Proposed Action One will enable the Air Force to complete environmental analysis for Proposed Action One. The terms and conditions of the BO for the federally-listed desert tortoise are presented in section 3.3.4 (USFWS 2003).

**Resource Analysis**

Table 3.1-1 presents the results of the process of identifying the resources considered in this EA. For purposes of this assessment, air quality, biological, cultural, soils and water resources, socioeconomics, and noise are evaluated. Due to the nature of the two proposed actions, other resources would either not be affected by construction as well as operations and maintenance, have no past or present on-site hazardous waste and materials concerns, or are sufficiently analyzed in previous documents. These documents include the: *F-22 Force Development Evaluation and Weapons School Beddown Nellis AFB, Environmental Impact Statement* (Air Force 1999a), *Renewal of the Nellis Air Force Range Land Withdrawal Legislative Environmental Impact Statement* (Air Force 1999b), *Integrated Natural Resources Management Plan Nellis AFB, Nellis AFR* (Air Force 1999c), *Water Requirements Study of the Nellis Air Force Range* (Air Force 1998a), *Final Environmental Assessment for Borrow Pits on Nellis Air*

*Force Range Nevada* (Air Force 1998b), *Environmental Assessment for Nellis Air Force Range Complex Fiber Optic Line Route from Indian Springs AFAF, Clark County, Nevada to Cedar Pass Facility, NAFR North Range Nye County, Nevada* (Air Force 1998c), *Regional Training Area Expansion, U.S. Air Force 99$^{th}$ Ground Combat Training Flight Environmental Assessment* (Air Force 1997a), and *An Inventory for Rare, Threatened, Endangered, and Endemic Plants and Unique Communities on Nellis Air Force Bombing and Gunnery Range, Clark Lincoln, and Nye Counties, Nevada* (TNC 1997) and can be incorporated by reference.

**Table 3.1-1 Resources Considered in the Environmental Impact Analysis Process**

| | ***Drivers*** | | ***Analyzed in this EA*** | |
|---|---|---|---|---|
| ***Resources*** | **Construction** | **Operations** | **Yes** | **No** |
| Air Quality | ● | ● | ● | |
| Biological Resources | ● | | ● | |
| Cultural Resources | ● | | ● | |
| Soils and Water Resources | ● | | ● | |
| Socioeconomics | ● | | ● | |
| Noise | ● | ●[1] | ● | |
| Airspace | | | | ● |
| Safety | | | | ● |
| Environmental Justice | | | | ● |
| Land Management and Use | | | | ● |
| Recreation | | | | ● |
| Visual Resources | | | | ● |
| Transportation | | | | ● |
| Hazardous Materials and Waste | | | | ● |

[1]Airspace as well as ground-based noise will be analyzed for this resource.

***Airspace***. Overall airspace management and use within NTTR would not be affected by Proposed Action One or Proposed Action Two. The minimum to maximum range of sortie-operations in the airspace overlying Proposed Action One alternatives, Restricted Area R-4806 in the South Range as well as Restricted Areas R-4807A and R-4809 in the North Range, would remain unchanged from those presented in the Nellis Renewal LEIS (Air Force 1999b). Establishment of the HTTC at either Range 64 (Alternative 1A) or Range 62 (Alternative 1B) could result in concentration of a higher proportion of the total R-4806 sortie-operations over the selected location. However, the Air Force neither anticipates nor proposes any overall increase in the total activity within R-4806. In addition, the basic pattern of flight activity would not change. Since this activity would occur over withdrawn lands (with no inhabitants) and within restricted airspace managed by Nellis AFB, variations in the internal distribution of sortie-operations would not affect airspace management. Under Proposed Action Two, aircraft operations would not be directly associated with the MOUT complex, so no increases in sortie-operations would occur. Although the proposed MOUT complex would underlie restricted airspace for Range 63A, baseline sortie-operations calculated for this airspace in the Nellis Renewal LEIS would not be changed by Proposed Action Two.

***Safety.*** Effects to human safety related to construction as well as ground operations and maintenance would be minimal and no different from standard, on-going activities occurring at NTTR. During construction, operations, and maintenance activities would be performed in accordance with applicable Office of Safety and Health Administration directives. There are no specific aspects of construction operations, or maintenance that would create any unique or extraordinary safety issues. All facilities used for weapons firing at the MOUT complex would be in fully-enclosed buildings and would not endanger civilian populations. These types of activities are currently undertaken at NTTR and at the Security Forces' training area and existing safety procedures would be followed and continued under both proposed actions. Aircraft safety would not be an issue under either proposed action because neither would change current operations and safety procedures at NTTR. Either alternative location for the HTTC under Proposed Action One would be within defined impact zones for NTTR, where ordnance delivery training is already authorized. No aspect of Proposed Action One (HTTC) would alter the safety conditions for those impact zones.

***Environmental Justice, Land Management and Use, Recreation, and Visual Resources***. The affected environment for both Proposed Action One and Two falls within withdrawn military lands (NTTR) or on Air Force-owned property at Indian Springs. Under Proposed Action One and Two, no low income or minority populations would be disproportionately affected by the action alternatives (1A or 1B, 2A or 2B) since no one lives in the NTTR or Range 63A or would be directly affected by construction, maintenance, and operation activities. Under Proposed Action Two, construction would occur on ISAFAF or on ISAFAF-owned property across U.S. Highway 95, therefore, no low income or minority populations would be disproportionately affected by either action alternative (2A or 2B). Land management and use would not change from existing military-related activities, and would not be impacted by Proposed Action One or Two. Recreation resources would not be affected by the proposed actions or their action alternatives since these are withdrawn military lands and the recreational use of these lands is restricted and would continue in the same manner that is currently practiced. Visual resources would not be affected since NTTR supports military activities and current equipment and roads are consistent with either of the activities proposed under Proposed Action One or Two.

***Transportation.*** Under Proposed Action One (for either action alternative), construction-related traffic would be short-term, temporary, and take place on a roadway (U.S. Highway 95) that can accommodate the anticipated level of traffic associated with construction equipment and employees. There would be minimal affects to this resource over the multiple years of construction. For operations and maintenance, transportation would continue on the same basis onto the range by approved personnel to maintain the HTTC and associated facilities. The amount of travel would be minimal (1 to 2 round trips per week) and dispersed over many miles of restricted-use roads. Consequently, no alternative under Proposed Action One would result in increased traffic or require modification to existing public roads. Since construction would take place on withdrawn lands, and weekly trips would not increase, traffic in these areas would not be impacted. Under Proposed Action Two, transportation between Nellis AFB, Range 63A (MOUT), and Indian Springs would be similar, if not less (due to consolidation of training and facility assets), than is currently being driven. Traffic levels would be low during construction and dispersed over multiple years. No increase to local traffic would occur. Effects of any of the proposed actions and their alternatives on existing transportation resources would not be measurable or noticeable.

***Hazardous Materials and Waste.*** Effects from hazardous materials and waste associated with construction as well as operation and maintenance of facilities and infrastructure related to Proposed Actions One and Two would be negligible to nonexistent. Existing environmental programs (e.g., Environmental Restoration Program) at NTTR have identified any hazardous materials and/or waste that might be found on NTTR and these areas have been avoided when locating any of the proposed facilities for Alternatives 1A, 1B, 2A, and 2B.

During construction, use of hazardous substances (e.g., gasoline) for fueling and equipment maintenance would be handled using existing Air Force instructions, policy, and procedures. Adherence to policy relating to hazardous storage and use during operation would be monitored under the Air Force's Environmental Compliance Assessment Management Program, which requires both internal audits and examination by independent reviewers. Existing Spill and Pollution Prevention Plans would be updated to address activities related to Proposed Action One and Two in accordance with Air Force regulations. Given the enforced requirement to ensure safe handling of materials and the minimal amounts of materials likely to be used, the probability of an effect on the environment would be negligible, therefore, further analysis in this EA is unwarranted.

## 3.2 AIR QUALITY

Understanding air quality for the affected area requires knowledge of: 1) applicable regulatory requirements; 2) types and sources of air quality pollutants; 3) location and context of the affected area; and 4) existing setting.

***Regulatory Requirements.*** Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. The Clean Air Act (CAA) and its subsequent amendments (CAAA) established the National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants: ozone ($O_3$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter less than 10 microns ($PM_{10}$), and lead (Pb). These standards (see Appendix B) represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. The Nevada Department of Environmental Protection (NDEP), Bureau of Air Quality (BAQ) has adopted the NAAQS, with some exceptions and additions (see Appendix B).

Based on measured ambient criteria pollutant data, the U.S. Environmental Protection Agency (USEPA) designates all areas of the U.S. as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. An area that is currently in attainment, but was formerly a nonattainment area is termed a maintenance area. An area is often designated as unclassified when there are insufficient ambient criteria pollutant data for the USEPA to form a basis for attainment status. Unclassified areas are typically rural or remote, with few sources of air pollution.

The CAA requires each state to develop a State Implementation Plan (SIP) which is its primary mechanism for ensuring that the NAAQS are achieved and/or maintained within that state. According to plans outlined in the SIP, designated state and local agencies implement regulations to control sources of criteria pollutants. The CAA provides that federal actions in nonattainment and maintenance areas do not hinder future attainment with the NAAQS and conform with the applicable SIP (i.e., Nevada SIP). There are no specific requirements for federal actions in unclassified or attainment areas. However, all federal actions must comply with all state and local regulations.

The CAA also establishes a national goal of preventing degradation or impairment in any federally-designated Class I area. As part of the Prevention of Significant Deterioration (PSD) program, mandatory Class I status was assigned by Congress to all national parks, national wilderness areas, memorial parks greater than 5,000 acres and national parks greater than 6,000 acres. In Class I areas, visibility impairment is defined as a reduction in visual range and atmospheric discoloration. Stationary sources, such as industrial complexes, are typically an issue for visibility within a Class I PSD area. The closest Class I Area to the two proposed actions (NTTR) is Death Valley National Park, which overlaps the California/Nevada border. However, this park is more than 60 miles from the affected portions of NTTR.

***Types and Sources of Air Quality Pollutants.*** Pollutants considered in the analysis for this EA include the criteria pollutants measured by state and federal standards. These include $SO_2$ and other compounds (i.e., oxides of sulfur or $SO_x$), volatile organic compounds (VOCs), which are precursors to (indicators of) $O_3$; nitrogen oxides ($NO_x$), which are also precursors to $O_3$ and include $NO_2$ and other compounds; CO and $PM_{10}$. These criteria pollutants are generated by the types of activities (e.g., construction) associated with both proposed actions. Airborne emissions of lead and hydrogen sulfide are not included because there are no known significant hydrogen sulfide or lead emissions sources in the region or associated with the proposed actions and their alternatives.

***Location and Context of Affected Area.*** Both Proposed Action One and Two occur within a single general region. The portions of NTTR where the proposed actions would occur are located approximately 20 (South Range) to 100 (North Range) miles northwest of Las Vegas. However, the specific affected environments differ for Proposed Action One and Proposed Action Two. The affected area for Proposed Action One, including the location of the proposed command, control, and communication facility at the Point Bravo SRCC, consists of sparsely populated lands lacking notable sources of emissions. Portions of Proposed Action Two (i.e., ISAFAF area) also fall within this area. In contrast, the existing Security Forces training facility and the proposed MOUT (R63A) fall within the Hydrographic Basin 212. This basin officially defines the boundaries of the Las Vegas Valley. The valley is situated on the edge of the Mojave Desert and experiences an arid climate typical of the southern Mojave Desert and covers approximately 500 square miles.

***Existing Air Quality Setting.*** With the exception of its very southern tip nearest Las Vegas (R63A), the NTTR is unclassified for state and federal air quality standards. All locations for Alternatives 1A and 1B lie within this unclassified area. The minor southern portion (R63A) of the NTTR (less than 5 percent) falls within the designated Las Vegas Valley nonattainment area for carbon monoxide and particulate matter. The location of the existing Security Forces training area in R63A and the location of the MOUT under Proposed Action Two lie within this area. The USEPA classified the Las Vegas Valley area as a "serious" nonattainment area for particulate matter (PM) and carbon monoxide (CO). In accordance with federal requirements, the Clark County Board of Commissioners has developed (August 2000) both a CO SIP and a $PM_{10}$ SIP for nonattainment areas of the county. Federal facilities located in NAAQS nonattainment or maintenance areas must comply with federal general air conformity rules and regulations under 40 CFR 51.

**Baseline Emissions for the Area Affected by Both Proposed Actions**

NTTR, covering about 2.9 million acres (approximately 4,500 square miles), includes dozens of ranges, hundreds of target acres, and numerous facilities. Associated training airspace not overlying the NTTR covers approximately 7,500 additional square miles. Available data on aircraft air emissions applies to both the NTTR and associated training airspace, not specific locations applicable to the two proposed actions. For ground-based emissions, all sources lie within NTTR or Air Force-owned property. Table 3.2-1 summarizes the baseline, ground-based and aircraft emissions at NTTR.

**Table 3.2-1 Baseline Ground-Based and Aircraft Operations Air Emissions (tons/year)**

| | *CO* | *VOCs* | *$NO_x$* | *$SO_x$* | *$PM_{10}$* |
|---|---|---|---|---|---|
| Ground-Based [1] | 21.0 | 11.2 | 81.4 | 5.08 | 84.2 |
| Aircraft [2] | 695 | 52 | 8,983 | 214 | 230 |

[1] Includes ground-based facility emissions from all non-exempt sources associated with the three operating facilities at the Tonapah Test Range (within the NTTR): i.e., Area 10, Cedar Pass, the O&M Compound (TECR), and the TPECR, as reported in the 2000 Air Emissions Inventory Report. Includes fuel combustion emissions from generators and equipment operating at these facilities (NAFB 2001).
[2] Source: Air Force 1999b.

Air emissions from ground operations facilities on the NTTR result primarily from on-range facilities, equipment, and ground maintenance. Aircraft emissions at the NTTR and associated military airspace derive from flight operations performed over a very large area that spans more than 12,000 square miles horizontally, and from the surface to unlimited altitudes vertically. The relatively small amounts of pollutants emitted are distributed within this large volume of air, thereby contributing minor concentrations at any one location. Air emissions from range activities and operations do not adversely affect public health and safety in this very sparsely populated portion of Nevada. The NTTR is withdrawn land and, as such, does not allow nonmilitary access without permission or local development of any kind.

### 3.2.1 Proposed Action One

***Existing Conditions.*** The majority of NTTR, including the proposed locations for Alternatives 1A and 1B, is on lands that have been designated as "unclassified" with respect to the NAAQS. NTTR includes no substantial stationary sources of emissions, and both ground-based and aircraft baseline emissions (refer to Table 3.2-1) are dispersed throughout large volumes of air.

The HTTC for Alternative 1A would be located in Range 64, Lincoln County, and for Alternative 1B, it would be located on Range 62, in Clark County. Air quality in Lincoln County is regulated by NDEP BAQ. The Clark County Department of Air Quality Management (DAQM) is the regulatory and enforcement agency in Clark County. Both agencies require permits for construction activities in order to implement the statewide fugitive dust regulation.

NDEP BAQ requires a "Surface Area Disturbance Permit" for construction activities that impact greater than 5 acres. The Clark County Health Department (CCHD) requires a "Dust Control Permit" and the submittal of a Dust Mitigation Plan for any soil disturbing or construction project greater than 0.25 acres in size. For projects that are greater than 10 acres in size, the CCHD requires a "Site-Specific Dust Mitigation Plan" that incorporates enforceable permit conditions, drawn from construction activities best management practices, into the Dust Control Permit.

***Environmental Consequences.*** Permanent operational emissions due to either action alternative (1A or 1B) would be insignificant in nature since implementation would not result in any additional aircraft sortie-operations. Minimal amounts of combustion exhaust would result from the heavy-duty diesel tractor engine used to pull the HTTC convoy, but these would be dispersed over the length of the track and not constitute a stationary source. Insignificant amounts of combustion emissions would also result from facility heating required for the single occupied SRCC building at Point Bravo. However, as a replacement for an existing building, any additional emissions would be negligible. Impacts resulting from combustive emissions from maintenance vehicles would be insignificant also since vehicles would make monthly maintenance trips to the HTTC and weekly trips to each emitter and scoring system site. These combustive pollutant impacts would not be large enough in any localized area to cause any exceedance of ambient air quality standards (i.e., NAAQS).

The majority of emissions related to Alternatives 1A and 1B would be generated by the construction of the HTTC associated facilities and infrastructure. Construction emissions associated with either action alternative would include fugitive dust emissions ($PM_{10}$) and combustion emissions (primarily CO and $NO_x$, but small amounts of VOCs, $SO_x$, and $PM_{10}$) from heavy-duty diesel construction equipment exhaust. Table 3.2-2 and 3.2-3 summarize construction emissions from each phase of the construction operations as well as total construction emissions for Alternatives 1A and 1B. Appendix B presents the methods and data used for air emissions calculations.

**Table 3.2-2 Alternative 1A: Projected Pollutant Emissions from Construction (tons/year)**

| | *CO* | *VOCs* | $NO_x$ | $SO_x$ | $PM_{10}$ |
|---|---|---|---|---|---|
| Phase I – FY04 | 49.9 | 6.3 | 69.4 | 5.9 | 56.9 |
| Phase II – FY05 | 42.0 | 5.9 | 76.7 | 6.3 | 32.6 |
| Phase III – FY06 | 37.3 | 5.2 | 65.3 | 5.4 | 29.7 |
| Phase IV – FY07 | 46.3 | 6.4 | 80.6 | 6.6 | 37.4 |

**Table 3.2-3 Alternative 1B: Projected Pollutant Emissions from Construction (tons/year)**

| | *CO* | *VOCs* | $NO_x$ | $SO_x$ | $PM_{10}$ |
|---|---|---|---|---|---|
| Phase I – FY04 | 58.5 | 7.2 | 77.1 | 6.6 | 70.5 |
| Phase II – FY05 | 42.0 | 5.9 | 76.7 | 6.3 | 32.3 |
| Phase III – FY06 | 37.3 | 5.2 | 65.3 | 5.4 | 29.4 |
| Phase IV – FY07 | 46.3 | 6.4 | 80.6 | 6.6 | 37.1 |

Emissions from any given phase of construction (i.e., combustion from construction equipment and dust from earth-moving activities) would represent a considerable, but only temporary increase in total ground-based missions for NTTR. Maximum emissions (per phase) for the NAAQS pollutants would result in temporary increases of 57 to 238 percent over existing totals for Alternative 1A and 64 to 279 percent for Alternative 1B. As noted above, existing ground-based emissions from facilities are minimal. The projected construction emissions would be temporary in nature, spread over 4 years, and dispersed across extensive areas consisting of withdrawn lands with no public access. These emissions would not adversely affect public health and welfare or result in exceedences of the NAAQS. However, these emissions would cease after construction and total emissions would return to baseline levels. Construction of all components of both action alternatives (1A and 1B) would occur within the unclassified area and outside the Las Vegas Valley nonattainment area, so no conformity analysis of emissions (in conformance with 40 CFR 91.153 (c)(1)) would be required. The Air Force would employ best management practices (e.g., soil stockpiling and covering, watering roads, gravelling, proper grading) to reduce fugitive dust emissions and acquire any appropriate state or county permits.

Emissions from both fugitive dust and construction vehicle exhaust would be widely dispersed across the extensive areas. Since both sources would emit relatively small ground-level releases with little initial dispersion and/or buoyancy, visibility effects of these emissions would occur only in the immediate vicinity (less than one mile). Therefore, these alternatives would not affect visibility within Class I areas in the region.

Baseline emissions would continue unchanged under the no-action alternative (1C). No construction or operations would take place related to establishing NTI, so no additional emissions would be generated.

### 3.2.2 Proposed Action Two

***Existing Conditions***. Total baseline emissions for NTTR have been described above (refer to Table 3.2-1). The proposed locations for Alternatives 2A and 2B lie at the southern boundary of the NTTR, and within Clark County. These action alternatives (the MOUT in Range 63A) also fall within the boundaries of the Las Vegas Valley CO and $PM_{10}$ nonattainment areas. As such, Proposed Action Two would be subject to the General Conformity Rule promulgated by the CAAA. This rule prohibits federal agencies from supporting actions that do not conform to an EPA-approved SIP. Under this rule, certain activities are explicitly given exemptions from preparing conformity determinations while others are assumed to be in conformity if the total annual project emissions are below *de minimis*. These *de minimis* levels are represented in tons per year and vary according to pollutant and the severity of the nonattainment classification. *De minimis* levels for serious nonattainment areas are 100 and 70 tons per year for CO and $PM_{10}$, respectively.

Other applicable requirements for sources in Clark County include compliance with CCHD rules and regulations including:

- Section 90 – Fugitive Dust from Open Areas and Vacant Lots
- Section 91 – Fugitive Dust from Unpaved Roads, Unpaved Alleys and Unpaved Easement Roads
- Section 92 – Fugitive Dust from Unpaved Parking Lots
- Section 93 – Fugitive Dust from Paved Roads and Street Sweeping Equipment
- Section 94 – Permitting and Dust Control for Construction Activities

As mentioned above, for projects that disturb more than 10 acres, the regulations in Section 94 require a "Site-Specific Dust Mitigation Plan" which incorporates enforceable permit conditions, drawn from Construction Activities Best Management Practices (see Section 94 Handbook), into the Dust Control Permit.

***Environmental Consequences.*** Permanent operational emissions under either Alternative 2A or 2B would be insignificant since the proposed action would not result in additional personnel vehicle trips. Insignificant amounts of combustion emissions may result from heating in the occupied buildings.

The majority of emissions resulting from Alternatives 2A or 2B would be generated by construction and be temporary in nature. These emissions would be dispersed over 5 years (FY02 to 06) of phased construction (refer to Table 2.1-4). Construction emissions associated with the action alternatives include fugitive dust ($PM_{10}$) and combustion (primarily CO and $NO_x$, but small amounts of VOCs, $SO_x$, and $PM_{10}$) from heavy-duty diesel construction equipment exhaust. Estimation of the construction emissions were based on conservative assumptions and assumed that site grading activities (generating fugitive dust) would be occurring on 25 percent of the affected acreage on any working day throughout the entire year (see Appendix B).

Table 3.2-4 summarizes projected construction emissions for both action alternatives. Although some of the building locations would differ between Alternatives 2A and 2B, the total acreage impacted and the total square footage of the buildings constructed would be identical. Therefore, air quality impacts for both alternatives would be the same.

**Table 3.2-4 Alternative 2A/B: Projected Pollutant Emissions from Construction (tons/year)**

| ***Year*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
|---|---|---|---|---|---|
| FY02 | 0.7 | 0.1 | 1.0 | 0.1 | 0.1 |
| FY03 | 0.4 | 0.05 | 0.6 | 0.1 | 0.04 |
| FY04 | 0.7 | 0.1 | 1.0 | 0.1 | 0.1 |
| FY05 | 27.7 | 3.9 | 54.8 | 4.4 | 19.3 |
| FY06 | 0.5 | 0.1 | 0.7 | 0.1 | 0.1 |

Under the action alternatives, the maximum annual (FY05) emissions from construction would be well below the *de minimus* (70 tons/year $PM_{10,}$ and 100 tons/year CO) thresholds established by the federal conformity rule. In FY05, construction would generate 19.3 tons of $PM_{10}$ and 27.7 tons of CO. Either action alternative would conform with the CO and $PM_{10}$ SIPs and would not affect regional air quality. No conformity analysis would be required.

Emissions from both fugitive dust and construction vehicle exhaust would be temporary and localized. These emissions represent negligible ground-level releases with little initial dispersion and/or buoyancy, so their effects would remain in the immediate vicinity (less than 1 mile). Therefore, no potential visibility impacts within Class I areas would be anticipated.

Under the no-action alternative (2C), no construction or operations would occur and no additional emissions would be generated. Baseline emissions for NTTR would remain unchanged.

***Combined Environmental Consequences from Proposed Action One and Proposed Action Two.*** During FY04 through FY06, construction for both proposed actions would overlap. Maximum combined emissions would occur in FY05, but due to the geographical separation of the two proposed actions, and the localized nature of their respective emissions, their emissions would not be additive to any measurable degree. Since emissions from Proposed Action One would not add to those of Proposed Action Two, no affect on conformity or attainment would result.

## 3.3 BIOLOGICAL RESOURCES

Biological resources incorporate living, native or naturalized plant and animal species and the habitats within which they occur. For purposes of the impact analysis, these resources will be divided into four major categories: 1) vegetation, 2) wetlands, 3) wildlife, and 4) threatened, endangered, or sensitive species. This analysis of biological resources addresses each category separately, and examines the impacts from Proposed Action One and Proposed Action Two.

The affected area for biological resources includes the locations for assets associated with the two proposed actions within the North and South Ranges of NTTR. Only those areas directly affected by ground-disturbing activities such as construction, road-building, or infrastructure development were assessed. As described in section 3.8, Noise, no changes to aircraft operations and associated noise would occur as a result of either proposed action. All baseline data were gathered from previous studies such as the *Integrated Natural Resource Management Plan for Nellis Air Force Base, Nevada* (Air Force 1999c), *Renewal of the Nellis Air Force Range Land Withdrawal, Legislative Environmental Impact Statement* (Air Force 1999b), rare species and wetlands surveys, and site photographs. Biological field surveys were not conducted.

### 3.3.1 Vegetation

Vegetation includes all existing terrestrial plant communities with the exception of wetlands or threatened, endangered, or sensitive species.

NTTR overlaps two distinct ecoregions: the Mojave Desert to the south and the Great Basin Desert to the north. The Mojave Desert is lower and warmer, receiving most of its precipitation as rain, whereas the Great Basin Desert is higher and colder, receiving more snow. The transition between the two deserts occurs very broadly along the 37th parallel (Air Force 1999b). As a result, most of the South Range is within the Mojave Desert, whereas most of the North Range transitions to the Great Basin Desert.
The native vegetation of NTTR consists primarily of desert scrub communities at low- to mid-elevations with mixed shrub and woodland communities at mid- to upper-elevations. Montane shrub communities dominate the highest elevations except for small patches of forest vegetation, which are limited to the highest mountain peaks and ridgelines. Some vegetation communities are strongly limited to, and may even be considered indicators of, either the Mojave or Great Basin Desert, whereas others are transitional or occur in both deserts where conditions are suitable (Air Force 1999b).

The South Range of NTTR lies in the northeastern portion of the Mojave Desert. Vast areas of the basins and bajadas of the Mojave Desert, below approximately 4,000 feet, often support a scrub community dominated by creosote bush and white bursage. Additional species include saltbushes, ephedras, brittlebush, desert mallow, cacti, and Mojave yucca.

Joshua trees occur and often form a distinctive Mojave Desert woodland community at upper elevations. Where soils are alkaline and clayey, such as valley bottoms and dry lake beds (playas), four-wing saltbush and shadscale dominate the saltbush community. The saltbush community is especially prevalent in a broad transition zone between the Mojave Desert and Great Basin. Mixed scrub vegetation typical of the Mojave Desert occurs on ISAFAF, where several associations including creosote bush, bursage, saltbush, and Joshua tree can be distinguished (Air Force 1999c).

At higher elevations in the Mojave Desert, approximately 4,000 to 6,000 feet, the blackbrush community may predominate. This community includes blackbrush, ephedras, turpentine-broom, and range ratany. In the highest mountains of the South Range, pinyon-juniper woodlands develop due to the increased precipitation and lowered temperatures. Single-leaf pinyon and Utah juniper are the dominant woody species.

The North Range is a transitional area between the Mojave Desert and Great Basin and supports a mixture of community types, including creosote bush scrub, Joshua tree woodland, pinyon-juniper woodland, mixed desert scrub community, Great Basin sagebrush scrub, black sagebrush scrub, and a sparsely vegetated rock outcrop community (Air Force 1999c). Farther north, the North Range fully transitions to the Great Basin Desert, dominated by sagebrush and saltbush vegetation. The vegetation of the basin floors of the North Range is typified by shadscale and greasewood and may include winter fat and green molly. Most of the middle- and upper-elevation bajadas are dominated by the sagebrush-pinyon-juniper community. Additional species that occur in this community include: rabbitbrush, joint fir, and occasional Joshua trees. Scattered Utah juniper can occur on the flanks near the upper limit of sagebrush vegetation. The dominant vegetation type in the North Range mountains, above approximately 5,000 feet, is pinyon-juniper woodland, with big sagebrush dominating the shrub layer. White fir occurs at elevations above approximately 8,000 feet, with single-leaf pinyon and limber pine.

In addition to the general vegetation of NTTR, the affected environment includes the South Range impact zones, dominated by non-native grasses. Vegetation in the impact zones has been disturbed by military activities for decades. Non-woody range weeds like halogeton, tumbleweed, and non-native grasses, including cheatgrass are abundant on disturbed sites (Air Force 1999b).

**Proposed Action One**

***Existing Conditions.*** Table 3.3-1 shows general vegetation and disturbance types at the proposed HTTC sites, emitter locations, and existing TOSS sites proposed for conversion to WISS sites. Data in this table were compiled from site photographs and supporting observations from cultural resources surveys.

All South Range sites, including the HTTC for both Alternative 1A and Alternative 1B (refer to Figures 2-2 and 2-3) are located within the creosote brush habitat. Both HTTC sites lie within existing impact zones where ordnance delivery (inert and live), ordnance clean-up, and maintenance activities have resulted in disturbance to vegetation. North Range sites are located in both saltbush and sagebrush habitats. All North Range (refer to Figure 2-7) sites (N1-N2) currently are disturbed from the existing towers; additional disturbance in the form of vehicle tracks occur outside of the footprint of the existing towers but within the 1-acre sites. Site-specific survey data were not available for the South Range TOSS converted to WISS sites (TO-1 through TO-12). Based on data from surrounding sites and overall habitat, these 12 sites occur within the creosote bursage/saltbush vegetation types. All contain existing TOSS towers and vehicle tracks that have disturbed vegetation.

| **Table 3.3-1 General Vegetation Type and Disturbance By Site (page 1 of 2)** | | |
|---|---|---|
| ***Site*** | ***Vegetation Type*** | ***Disturbance*** |
| HTTC 1A[1] | Creosote | Ordnance Effects and Vehicle Tracks |
| HTTC 1B[2] | Creosote | Ordnance Effects and Vehicle Tracks |
| N1 | Saltbush, Bunchgrass | Existing Site |
| N2 | Saltbush | Existing Site |
| N3 | Sagebrush, Saltbush | Existing Site |
| N4 | Bare | Existing Site |
| N5 | Sagebrush, Rabbitbrush | Existing Site |
| N6 | Saltbush, Rabbitbrush | Existing Site |
| N7 | Saltbush, Sagebrush, Bunchgrass | Existing Site |
| N8 | Saltbush, Rabbitbrush | Existing Site |
| N9 | Saltbush, Sagebrush, Bunchgrass | Existing Site |
| N10 | Bunchgrass | Existing Site |
| N11 | Annual weedy species | Existing Site |
| N12 | Bunchgrass, Rabbitbrush | Existing Site |
| S1-T | Creosote | Vehicle Tracks |
| S2-T | Desert Pavement, Creosote | Existing Site |
| S3-T | Desert Pavement, Yucca | Existing Site |
| S4-T | Desert Pavement, Yucca | Vehicle Tracks |
| S5-T | Creosote | Existing Site |
| S6-T | Cholla, Yucca, Creosote | Existing Site |
| S7-T/W2-A[1] | Yucca, Creosote | Existing Site |
| S8-T | Creosote | Existing Site |
| S9-T | Cholla, Yucca, Joshua Tree | Existing Site |
| S10-T | Yucca, Joshua Tree | Existing Site |
| S11-T | Creosote | Existing Site |
| S12-T | Creosote | Existing Site |
| S13-T | Creosote | Existing Site |
| S14-T | Creosote | Existing Site |
| S15-T | Creosote, Desert Pavement | Existing Site |
| S16-T/TO-6 | Creosote, Cactus, Joshua tree | Existing Site |
| S17-T | Creosote, Joshua tree | Existing Site |
| S18-T/TO-9 | Desert Pavement, Yucca | Existing Site |
| S19-T | Creosote, Joshua tree | Existing Site |
| S20-T | Creosote | Existing Site |
| TO-1 | Creosote, Saltbush | Existing Site |
| TO-2 | Creosote, Saltbush | Existing Site |
| TO-3 | Creosote, Saltbush | Existing Site |

| | | |
|---|---|---|
| TO-4 | Creosote, Saltbush | Existing Site |
| TO-5 | Creosote, Saltbush | Existing Site |
| TO-7 | Creosote, Saltbush | Existing Site |
| **Table 3.3-1 General Vegetation Type and Disturbance By Site (page 2 of 2)** | | |
| ***Site*** | ***Vegetation Type*** | ***Disturbance*** |
| TO-8 | Creosote, Saltbush | Existing Site |
| TO-10 | Creosote, Saltbush | Existing Site |
| TO-11 | Creosote, Saltbush | Existing Site |
| TO-12 | Creosote, Saltbush | Existing Site |
| W1-A[1] | Creosote, Cactus, Yucca | Existing Site |
| W1-B[2] | Creosote, Desert Pavement | Vehicle Tracks |
| W2-B[2] | Creosote, Yucca | Vehicle Tracks |
| W3-A[1] | Creosote | Existing Site |
| W3-B[2] | Creosote, Joshua Tree, Cactus, Cholla | None |

[1] Alternative IA (W2-A co-located with S7-T)

[2] Alternative 1B

Notes:

N1 through N12 = North Range existing TOSS converted to WISS

S1-T through S20-T = South Range proposed emitter sites

TO-1 through TO-12 = South Range existing TOSS converted to WISS

"W" sites are proposed WISS sites associated with the HTTC

Of the 20 emitter sites (S1-T through S20-T) within the South Range, 19 consist of existing sites with associated disturbance. The single new site (S4-T) reflects some disturbance in the form of vehicle tracks. Creosote and associated plants comprise the dominant vegetation at almost all of these sites.

For Alternative 1A, all three proposed new WISS sites (W1-A, W2-A, W3-A) include creosote and disturbance from existing activities. Proposed WISS sites W1-B, W2-B, and W3-B (Alternative 1B) represent new sites with minimal to no disturbance.

***Environmental Consequences.*** Impacts to vegetation would include disturbance or removal of plant materials through establishment of the HTTC and associated facilities, construction or upgrading of roads, installation of fiber optic and power lines, and construction of WISS and emitter sites. As noted above almost all of these acres have been affected by some level of disturbance, ranging from vehicle tracks to existing facilities and ordnance impacts. For Alternative 1A, the area in which vegetation could be disturbed would not exceed approximately 869 acres (refer to Table 2.1-3). Approximately 114 acres of vegetation in the South Range would be removed through new road (including the convoy road and fiber optic and power line) construction; 636 acres would be disturbed for the HTTC, and 22 acres to emitter sites and WISS conversions. The additional 54 acres for Alternative 1A, in the South Range would be affected by existing road improvements (13 acres), installation of the convoy turnaround point (40 acres), and Point Bravo SRCC construction (less than 1 acre)—all on previously disturbed lands. In the North Range, 12 acres of previously disturbed lands would be affected due to TOSS to WISS upgrades and 31 acres for fiber optic and power line installation.

Of the total 869 acres removed, approximately 12 acres are located within the sagebrush or saltbush habitats of the Great Basin Desert. The remaining 857 acres are all located within the predominately creosote and bursage habitats of the Mojave Desert. A majority of these acres have previously received some level of disturbance from off-road and/or military activities.

Alternative 1B would affect a maximum of 946 acres, disturbing or removing the vegetation present on the lands. Approximately 934 acres would consist of predominately creosote and bursage habitats. An additional 12 acres would be affected in the sagebrush or saltbush habitats. The maximum impact to vegetation on the South Range, as a result of new road (including convoy road as well as power and fiber optic lines) construction, would be approximately 172 acres. The HTTC would impact about 628 acres, emitters and WISS upgrades would impact 22 acres, similar to Alternative 1A. An additional 81 acres, on previously disturbed lands would be affected by existing road improvements (40 acres), installation of the convoy turnaround point (40 acres), and Point Bravo SRCC (about 1 acre) construction. In the North Range, the level of disturbance (43 acres) would be the same as that described under Alternative 1A.

Many sites common to both action alternatives have already been subject to varying degrees of disturbance from previous off-road activities or ordnance-delivery training. This is especially true of the HTTC sites, which lie within ordnance impact zones, and most of the roads, which already exist. However, several sites do contain Joshua trees and cactus. These locations would either be avoided, or the Joshua trees and cactus would be salvaged prior to land-disturbing activities in conjunction with standard BLM operating procedures. The disposal of salvaged plants is coordinated through the BLM Forestry Program Lead (Air Force 1999). In addition, the Air Force would prevent any exotic weed infestations within the disturbed sites as prescribed under existing Air Force policies (Air Force 1999c).

Under the no-action alternative there would be no change to current baseline conditions. No new construction, upgrades, or training operations would occur. There would be no impacts to vegetation from NTI Proposed Action One.

**Proposed Action Two**

***Existing Conditions.*** Vegetation at the affected area for the MOUT and associated MOUT facilities is highly disturbed, creosote habitat. Much of the vegetation has previously been removed or disturbed. Areas within ISAFAF and the ISAFAF-owned lands south of U.S. Highway 95 are developed. Vegetation found within these areas are limited to landscaping and weedy species.

***Environmental Consequences.*** Approximately 97 acres would be impacted through development of the MOUT with the implementation of either Alternative 2A or 2B. Impacts would be negligible as the areas have already been disturbed. No impacts to vegetation would occur on the ISAFAF or associated properties, across U.S. Highway 95, for either action alternative.

Under the no-action alternative there would be no change to current baseline conditions. No new construction, upgrades, or training operation would occur. There would be no change in the level of impacts to vegetation.

***Combined Environmental Consequences for Both Proposed Action One and Proposed Action Two.*** A maximum of approximately 1,043 acres of vegetation would be affected if both Proposed Action One (Alternatives: 1A, 869 acres and 1B, 946 acres) and Proposed Action Two (Alternatives 2A or 2B, 97 acres) were implemented. This would not result in an adverse impact, based on the small, scattered, and disturbed nature of the sites and the large size of NTTR. Furthermore, a substantial number of these sites have been disturbed and continue to experience disturbance due to their location in ordnance impact zones or existing facilities.

### 3.3.2 Wetlands and Waters of the United States

Wetlands are considered sensitive and protected by Section 404 of the Clean Water Act (CWA). Jurisdictional wetlands consist of those that meet the three criteria defined in the *Corps of Engineers Wetlands Delineation Manual* (1987) and are under the jurisdiction of the U.S. Army Corps of Engineers. Wetlands are generally associated with drainages, stream channels, and water discharge areas (natural and man-made). Arroyos, playas, ephemeral channels, and wetlands constitute waters of the U.S. and may be subject to regulations under Section 404 of the CWA if their use, degradation or destruction could affect interstate or foreign commerce.

Surface water resources are extremely limited on NTTR. The surface water resources present on the range, consist of seeps, springs, ponds (both natural and artificial), and one intermittent stream (Breen Creek) evaluated these resources in 1996 (Air Force 1997b). Most of these water resources occur in the North Range, and those few in the South Range lie within the mountains or are man-made. Not all playas and other potentially seasonally or ephemerally wet areas have been systematically investigated. However, as these sites are largely unvegetated, they would not qualify as jurisdictional wetlands. Most of NTTR's surface waters have been subjected to modification by humans and heavily impacted by wild horses, limiting their value to wildlife (Air Force 1996b). The primary function of these surface waters on NTTR is wildlife habitat, providing a limiting critical resource for wildlife species living in or migrating through this arid environment.

**Proposed Action One**

***Existing Conditions***. Based on the results of a range-wide survey (Air Force 1997b) there are no known water sources or wetlands, or waters of the U.S. located within the affected areas for either Alternative 1A or 1B. However, the locations of the HTTC and associated facilities may contain ephemeral washes and arroyos that may constitute waters of the U.S.

***Environmental Consequences.*** No documented wetlands or waters of the U.S. exist within potentially affected areas. In the event that undocumented ephemeral washes or arroyos are encountered, a 404 determination under the CWA would be made. If any grading, filling, or road crossings of washes and arroyos were necessary, the Air Force would employ best management practices such as culverts and erosion control measures (proper grading and gravelling) to prevent disruption to water flow. The Air Force would obtain necessary permits and conduct consultation, as appropriate, with the U.S. Army Corps of Engineers.

Under the no-action alternative there would be no change to current baseline conditions. No new construction, upgrades, or operations would occur from implementation of the NTI. Therefore, no impacts would occur to wetlands on NTI.

**Proposed Action Two**

***Existing Conditions.*** Based on the results of a range-wide survey (Air Force 1997b), there are no documented wetlands or waters of the U.S. located within the affected area for Alternative 2A or 2B.

Neither the ISAFAF or the Air Force property across U.S. Highway 95 has the potential to contain such resources since both are developed. However, the proposed MOUT location may contain ephemeral washes and arroyos.

***Environmental Consequences.*** No wetlands or documented waters of the U.S. exist within potentially affected areas. In the event that undocumented ephemeral washes or arroyos are encountered, a 404 determination under the CWA would be made. If grading, filling, or road crossings of washes and arroyos were necessary, the Air Force would employ best management practices such as culverts and erosion control measures to prevent disruption of water flow. The Air Force would obtain necessary permits and conduct consultation, as appropriate, with the U.S. Army Corps of Engineers.

Under the no-action alternative there would be no change to current baseline conditions. No new construction, upgrades, or training operation would occur.

***Combined Environmental Consequences From Both Proposed Action One and Proposed Action Two.*** There would be no combined impacts to wetlands from the implementation of Proposed Action One and Two. Neither action includes areas containing wetlands or documented waters of the U.S. In the event that undocumented ephemeral washed or arroyos are encountered, a 404 determination would be made. The Air Force would obtain necessary permits and conduct consultation, as appropriate, with the U.S. Army Corps of Engineers.

### 3.3.3 Wildlife

For the purposes of this EA wildlife includes all vertebrate animals (i.e., fish, amphibians, reptiles, birds, and mammals) with the exception of those identified as threatened, endangered, or sensitive species which are discussed in 3.3.4. Wild horses and burrows are also included and protected by Public Law 92-195, the Wild Free-Roaming Horse and Burrow Act of 1971, as amended.

Due to the presence of the Great Basin and Mojave deserts, the transition zone between them, and the desert springs and riparian areas of the region, NTTR encompasses diverse habitats which support varied and locally abundant animal communities. The range of wildlife supported by this great diversity of habitat, and commonly found within NTTR, includes over 30 species of reptiles, 60 species of mammals, and over 240 species of birds (Air Force 1999b).

**Proposed Action One**

***Existing Conditions.*** No site-specific wildlife surveys were performed for any of the potentially affected areas; however, species potentially found near or on the sites would be similar to previously surveyed nearby locations.

Wildlife within the South Range includes species that are primarily associated with Mojave desert scrub and woodland habitats. Common mammals of the South Range include coyote, badger, black-tailed jackrabbit, and desert kit fox. These species can be found in all habitat types in low numbers, predominately in areas without heavy human disturbance. Desert bighorn sheep prefer the roughest and remotest habitat on or near the mountain tops, although this species will move farther down the slopes during the winter. Wild burros, which escaped or were released periodically over the last 200 years, are found in low numbers within the creosote bush scrub habitat. Mule deer, mountain lion, and bobcat occur in the mountains of the South Range, although these large mammals are more numerous on the North Range (Air Force 1999c).

Desert bighorn sheep occur in the mountains above the valleys in which the proposed HTTC is located under both Alternative 1A and 1B. All HTTC components for either action alternative would occur on valley floors and within the prescribed NTTR impact zones where sheep rarely, if ever, venture.

Common small mammals include whitetailed antelope squirrel, Merriam's kangaroo rat, longtailed pocket mouse, cactus mouse, and southern grasshopper mouse. These rodent species are normally found in loose sandy soils in areas with creosote bushes whereas the canyon mouse and desert woodrat are associated with rocky soils, canyons, and Joshua trees.

A bird survey in 1996 documented the presence of 114 avian species on NTTR (Air Force 1999c). These species range from common ravens and cactus wrens to raptors, including peregrine falcons. The report summarized avian use of the desert scrub and higher elevation woodland communities as relatively low through much of the year, particularly for wintering and breeding. Springs and ponds supported the greatest number of birds, although the wetland habitat makes up only a small proportion of NTTR.

Reptiles are especially adapted to drought conditions and extreme temperatures and are, therefore, well represented in the South Range. The most notable reptile species found in the Mojave creosote scrub habitat is the desert tortoise (see section 3.3.4). Lizard species include side-blotched lizard, California whiptail, and others. Snakes include the coachwhip, gopher snake, and the Mojave rattlesnake.

The limited surface water habitat and desert springs habitat within the South Range provide extremely valuable resources for wildlife species. Two species of amphibians, the western spadefoot toad and the western toad may occur near natural or man-made bodies of water. There are no native fish populations on NTTR.

Wildlife in the vicinity of the North Range includes species that are primarily associated with Great Basin montane scrub, pinyon-juniper woodland, Great Basin desert scrub, desert springs, and open water habitats. These habitats support numerous wildlife species including several species considered sensitive by state and federal governments. Most of the North Range comprises Great Basin habitats, the exceptions being in the southwestern corner, which is part of the transition between Mojave and Great Basin deserts. As a result, many (but not all) wildlife species associated with both mojave and Great Basin habitats will occur.

Wildlife species associated with Mojave desert habitats found in the North Range are similar to those described above in the South Range section. Most of the common, larger mammal species that occur in the South Range habitats are similarly found in the North Range. A population of bighorn sheep occurs on Stonewall Mountain. In addition, the rougher, more densely vegetated regions in the higher elevations of the North Range also support mountain lion, bobcat, and mule deer. Pronghorn antelope and wild horses, however, occur predominantly in desert scrub communities found in the North Range, particularly in Cactus Flat, on alluvial fans bordering Breen Creek, and in the Kawich Valley.

The rodents of the Great Basin desert scrub habitat differ from those of the southern Mojave desert and include the pallid kangaroo mouse, dark kangaroo mouse, sagebrush vole, and chisel-toothed kangaroo rat.

Several bat species are documented on the range in a NTTR-commissioned bat survey report (Air Force 1999b). Six species of bats, of the 20 species potentially occurring in the area, were documented on NTTR including long-legged myotis, fringe-tailed myotis, California myotis, pipistrelle, Townsend's big-eared bat, and pallid bat. The California myotis was the most widespread and commonly observed species in the report and was found in all habitats that were sampled.

Bird species typical of the sagebrush community include the sage thrasher, sage sparrow, and horned lark. Chukars have been introduced into the area and survive in rocky habitat and desert scrub near freshwater habitat. Raptors, regularly observed in the area, are similar to those found in the Mojave desert scrub in the South Range. The pinyon-juniper woodland supports the greatest bird diversities in the region.

Reptiles are less abundant in the North Range, which is colder than the Mojave Desert Scrub habitat in the South Range. Some reptile species found in the North Range are also observed in the South Range (e.g., side-blotched and whiptail lizards). Additional species include sagebrush lizard, leopard lizard, and the Great Basin rattlesnake. Desert tortoise are not found in the North Range (see section 3.3.4). Amphibians on the North Range are restricted to the rare areas near water and include the Great Basin spadefoot toad. Native fishes are not known or expected to occur because of the lack of perennial pools of water, of sufficient extent, to sustain populations during drought.

***Environmental Consequences.*** The types of effects on wildlife may include individual mortality, disturbance, removal, or fragmentation of habitat and construction noise disturbance. However, such effects would either be unlikely to occur or be minimal. Construction would affect a maximum total of 869 acres for Alternative 1A. Of the total acreage removed, approximately 12 acres would be located within the sagebrush or saltbush habitats of the Great Basin Desert. The remaining 857 acres are all located within the predominately creosote and bursage habitats of the Mojave Desert. These acreages contain potential habitat for many of the species mentioned above, although as described in section 3.3.1, vegetation, most of the habitat is disturbed.

Potential impacts due to disturbance, removal, or fragmentation of habitat would be minimal. With the exception of the HTTC sites and new road construction, all sites are 1 acre or less and spread out over approximately 2.9 million acres of habitat on NTTR. In addition, a majority of these sites have already received some type of disturbance from previous off-road activities and several decades of military activities.

New road construction could result in limited impacts to reptiles. Roads (particularly the convoy portion) could act as barriers to movement or burrowing. In addition, the roads could attract reptiles seeking warmth, and increase mortality rates. However, these impacts would be limited to individuals in areas of construction and would not be expected to impact the overall population of the ecosystem.

The larger HTTC sites may impact wildlife by displacing individuals, especially small mammals, reptiles, and birds. However, since the construction would be done in phases, over a period of 4 years, species should have time to relocate. Wildlife use of the affected areas is expected to be minimal due to the human (i.e., military training and ordnance delivery) disturbances currently associated with these locations. Loss of forage should not impact any species, since there would be plenty of vegetation remaining and available on the approximate 2.9 million acres of NTTR.

Potential impacts to wildlife from construction noise would be temporary, and limited to the vicinity of construction sites. Individual animals may be affected for a short time by noise disturbance. Reactions may vary, but could include leaving the immediate vicinity or coming out of hibernation. Due to the small nature of the area disturbed and the low number of wildlife currently in the region of these sites, or in immediately surrounding habitat, impacts would be minimal.

Noise associated with flight activities would not be expected to affect wildlife. The addition of the HTTC would not increase low-altitude overflights of bighorn sheep habitat. Flight patterns at low-altitude would continue to be oriented north-south between the mountain ridges that comprise bighorn sheep habitat.

Vehicle traffic on range access roads would increase temporarily during construction. Since most of these roads already exist, the temporary increase would not likely affect wildlife already habituated to the presence of a road. Long-term operations would not noticeably increase traffic.

Alternative 1B would affect a maximum of 946 acres through disturbance or removal of vegetation. As noted above, most of this habitat has been subject to previous disturbance. Approximately 934 acres of predominately creosote, saltbush, and bursage habitats would be affected. An additional 12 acres would be impacted in the sagebrush or saltbush habitats. Impacts to wildlife would be similar to those discussed for Alternative 1A.

Under the no-action alternative there would be no change to current baseline conditions. No new construction, upgrades, or training operations would be undertaken associated with NTI Proposed Action One, therefore, no impacts to vegetation would occur.

**Proposed Action Two**

***Existing Conditions.*** Wildlife potentially found at proposed sites for Alternative 2A and 2B would be the same as those described for the South Range under Proposed Action One. However, habitat is much more limited at these sites due to previous, heavy land disturbance. The MOUT facility would be constructed on disturbed, creosote shrubland. Lands within ISAFAF, and the ISAFAF property south of

U.S. Highway 95, are considered developed. Wildlife found within these areas is limited to transients or species adapted to co-habitation with humans.

***Environmental Consequences.*** Impacts to wildlife from habitat loss and construction noise would be negligible, due to the previously developed and disturbed nature of the sites.

Under the no-action alternative there would be no change to current baseline conditions. No new construction, upgrades, or training operation would be undertaken, therefore, no new impacts to wildlife would occur.

***Combined Environmental Consequences for Both Proposed Action One and Proposed Action Two.*** A maximum of approximately 946 acres of wildlife habitat would be affected if both Proposed Action One and Proposed Action Two were implemented. This would represent a minimal impact to wildlife, based on the small, scattered nature of the sites and the large area of surrounding available habitat.

### 3.3.4 Threatened, Endangered, and Sensitive Species

Threatened, endangered, or sensitive species are defined as those species considered rare or in danger of becoming extinct and listed as threatened, endangered, or proposed as such, by the USFWS and/or Nevada Division of Wildlife (NDOW). Protection of sensitive biological resources is accomplished through the Endangered Species Act, which protects federally-listed threatened and endangered plant and animal species. The State of Nevada also protects plant and animal species listed through the Nevada Revised Statutes and regulations set forth in the Nevada Administrative Code. Additionally, the Nevada Natural Heritage Program maintains a database of state species of concern.

Species discussed in this section are state- and federally-listed, or proposed for listing as threatened or endangered, or species of concern, and are known or expected to occur on NTTR. Appendix A contains lists of these special status species.

**Proposed Action One**

***Existing Conditions.*** There are no federally-listed threatened or endangered plant species known or likely to occur within NTTR. However, there are 38 state- or federally-listed plant and animal species of concern occurring or potentially occurring within the affected environment of NTTR (USFWS 2001).

Table 3.3-2 lists those plant species that have been confirmed as occurring on NTTR. None of these species are known to occur on or within 0.5 miles of any of the proposed sites under Alternatives 1A or 1B. Appendix A lists all 20 potentially occurring plant species, their status and brief description of the plant and its habitat.

| **Table 3.3-2 Federally-Listed Plant Species of Concern Occurring on NTTR** | |
|---|---|
| Clokey eggvetch | Half-ring pod milkvetch |
| Beatley's milkvetch | Sanicle biscuitroot |
| Eastwood's milkvetch | Sheep fleabane |
| Merriam bearpoppy | Pahute Mesa beardtongue |
| Sheep range milkvetch | Beatley's phacelia |
| Parish's phacelia | |

The desert tortoise is the only federally-listed wildlife species known to occur within the areas of NTTR potentially affected by Proposed Action One. Eighteen additional state or federal wildlife species of concern occur or potentially occur within the affected areas on NTTR (Appendix A, Table A-2).

The Mojave desert population of the desert tortoise, whose general distribution includes portions of NTTR, was listed as threatened by the USFWS on April 2, 1990. The USFWS attributes the decline of this species to disease, predation from increased raven populations, collecting, vehicle mortalities, and habitat degradation, destruction, and fragmentation. The species' range in this region lies primarily within the Mojave desert scrub habitat at elevations below 4,000 feet. Desert tortoise home ranges vary with location and year, but may cover from 25 to 200 acres. Basic habitat requirements include the quality of forage species, shelter from predators and environmental extremes, suitable soil types for burrowing, nesting and over-wintering, vegetation for cover and shelter and adequate area for movement and dispersal. These requirements may be met in a variety of plant communities including Joshua tree, Mojave yucca, creosote bush, and saltbush scrub. Tortoise are herbivorous, with the most important food apparently being desert annuals, cacti, and grasses. Desert tortoise mating starts with Spring emergence and may continue until Fall dormancy. Nesting occurs from May to July. Females dig nests, deposit eggs, and abandon the nest; incubation varies from 90 to 120 days (Revegetation Innovations 1992). Desert tortoise habitat and burrows are found most commonly found within creosote bush scrub communities on flat areas or gently sloping areas, washes, bajadas within valley floors. However, they may also be found in steeper, rockier areas. Soil structure is a important limiting factor for tortoise habitat. Soils must be firm enough to hold burrows, but soft enough to allow digging. A variety of soil types, from sandy to sandy-gravely, may be used.

For NTTR, desert tortoise habitat occurs in the areas of the South Range consisting of Mojave desert scrub. This area within the South Range represents a small percentage of the available desert tortoise habitat within the Northeastern Mojave Recovery Unit (refer to Figure 1-1). The South Range lies within the extreme northern limits of desert tortoise geographical extent. Areas within the North Range potentially affected by this proposed action lie outside desert tortoise habitat. The NTTR falls within the Coyote Spring Desert Wildlife Management Area (DWMA), which has been designated as part of the recovery units based on the *Desert Tortoise (Mojave Population) Recovery Plan* (1994). However, the NTTR is not part of the designated critical habitat areas (USFWS 1994). Designated recovery units contain both “suitable” and “unsuitable” habitat. Some areas within NTTR, such as the impact zones, where most of alternatives 1A and 1B occur, are located in areas that are considered “unsuitable” or are highly disturbed and do not contain nesting, sheltering, or foraging habitat (USFWS 1994).

On a site-specific basis for Proposed Action One, several factors affect the potential presence and/or quality of desert tortoise habitat at these proposed sites and locations (e.g., HTTC). First, most of these sites include the effects of past and ongoing disturbance as a result of authorized range use. Both alternative HTTC sites lie within existing ordnance impact zones containing targets and affected by air-to-ground ordnance impacts as well as range clean-up. All but four of the proposed WISS and emitter sites support existing facilities and are previously disturbed. Proposed roads, powerlines, and fiber optic cable routes would follow existing roads except for 8 miles under Alternative 1A and 10 miles under Alternative 1B. Second, the USFWS stated in a 1994 Biological Opinion (USFWS 1994) that areas in NTTR such as the defined impact zones are considered “unsuitable” desert tortoise habitat or highly disturbed. Third, there are no designated “recovery areas” for the desert tortoise in the South Range (USFWS 2003).

The low to very low probability of desert tortoise within the affected areas is supported by the several desert tortoise surveys that have been conducted on the NTTR South Range. These surveys (Figure 3-1) have shown that the proposed affected areas for the HTTC and associated facilities in Range 64 and Range 62 clearly lie near the northern limits of the desert tortoise range. In this area, population densities are generally lower and populations tend to be “patchy.” Surveys of the South Range have shown a range of density from 1 to 45 desert tortoise per square mile (USFWS 1994), but the areas affected by Proposed Action One were found support a very low (0 tortoise per square mile) to low (1 to 3 tortoise per square mile) population density. The following details the methods and results of these surveys.

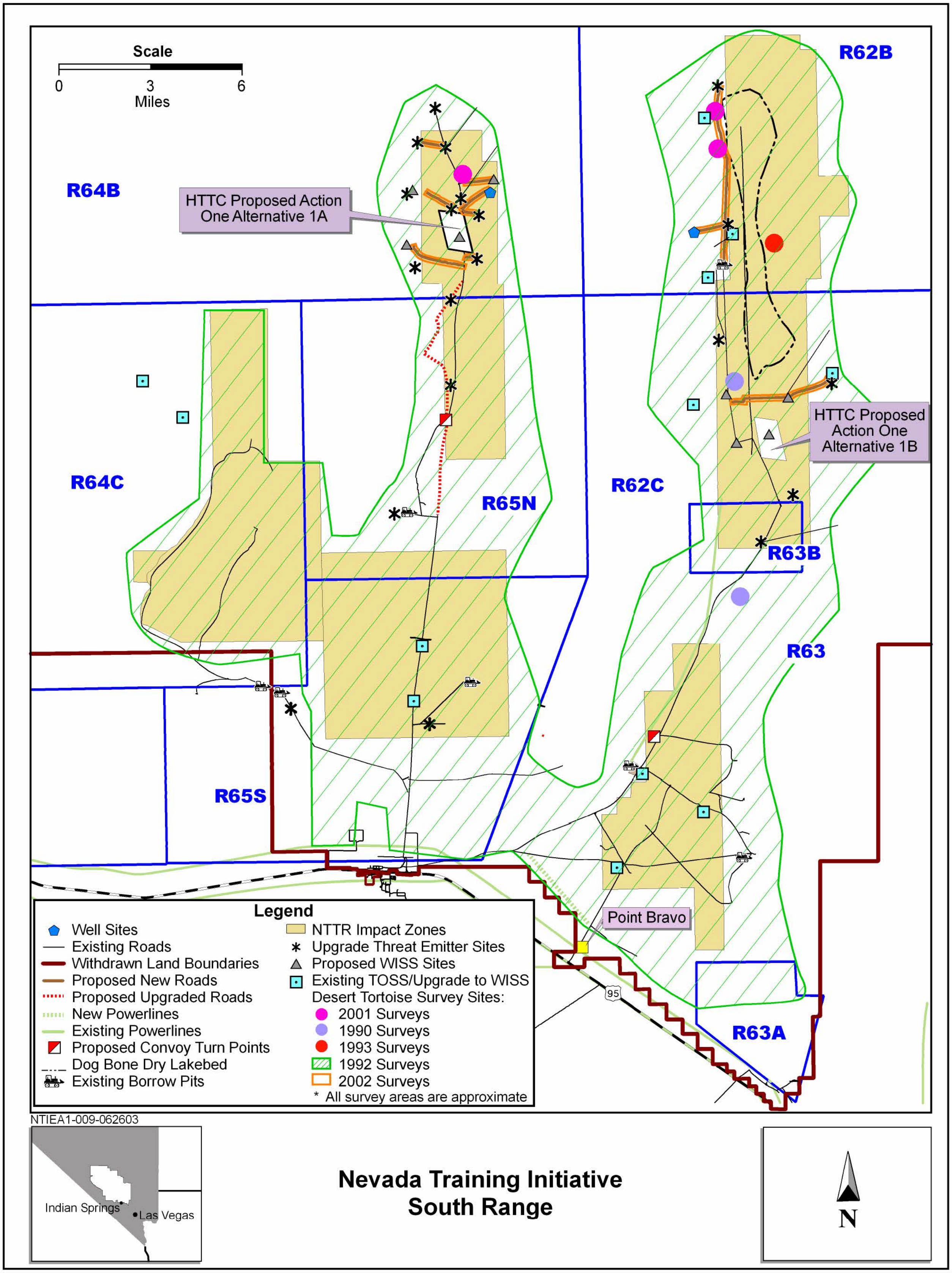


**Figure 3-1 Desert Tortoise Survey Areas 1992-2002**

The most extensive survey was completed during 1992 (Revegetation Innovations 1992) covering approximately 459 square miles and including all areas below 3,600 feet in the Indian Springs Valley, and below 4,000 feet in the Three Lakes Valley, the eastern fringes of Frenchman Valley, and the Nellis Small Arms Ranges in the Las Vegas Valley. All existing impact areas were surveyed using three 0.5 mile-long transects, 30 feet wide, within each topographic map section.

These areas encompass all potentially affected areas under Proposed Action One. Surveyors recorded any evidence of tortoise or tortoise activity (tracks, eggshells, burrows, carcasses, scat). This survey found desert tortoise population densities within these areas, which include all proposed areas of construction for the HTTC and associated facilities in Range 64 and Range 62, to be very low (0 tortoise per square mile) to low (1 to 3 tortoise per square mile), relative to other parts of the tortoise's range (USFWS 1997). Only 110 of 431, or 25 percent, of the transects showed any sign of (burrows, carcasses, scat) or actual presence of the desert tortoise.

In 1990, three surveys, covering 890 acres within the portion of Range 62 near the proposed HTTC (Alternative 1B), were preformed: 1) a 100-percent survey of 560 acres along the southwestern edge of Dog Bone Lake (about 1 mile from the proposed Alternative 1B HTTC site) located 5 desert tortoises, 25 active burrows, 3 carcasses, and 26 inactive burrows; 2) another survey of 260 acres, about 4.5 miles south of the proposed HTTC, did not locate any sign of or actual presence of tortoise; and 3) seven 10-acre sites in Indian Springs and Three Lake Valleys, found no desert tortoise or desert tortoise signs.

A 1993 survey of approximately 70 acres east of Dog Bone Lake, within the impact zone in R62 (about 1 mile west of proposed WISS site TO-6), located 2 desert tortoises, 13 active burrows, 6 carcasses, 6 scat, and 24 inactive burrows. This survey used transects similar to those in the 1992 survey of four 40-acre plots. Sixteen additional 10-acre surveys were conducted at sites located within Indian Springs (Range 64) and Three Lakes Valleys (Range 62). No desert tortoise or sign of tortoise was located at any of these sites.

In 2001, a 100-percent coverage survey was completed for a 7.5-mile corridor proposed for road construction. Three corridor segments were surveyed: two segments totaling approximately 6 miles extended along the west side of Dog Bone Lake within the impact zone in Range 62, near proposed sites S16-T and TO-6. The remaining section was located in the northern portion of the impact zone of R64B. This survey did not locate any desert tortoise or active burrows and noted evidence of previous disturbance from training activities. Five inactive tortoise burrows were located (Air Force 2002).

The most recent survey conducted in June 2002, consisted of a 100-percent presence/absence survey of the proposed HTTC alternatives. The proposed new roads were surveyed out to 300 feet from each road centerline; parallel transects spaced approximately 25-feet apart were surveyed with each biologist walking 15 feet on either side of the transect centerline. Approximately 275 transects were conducted in each of the two alternative sites. Six additional transects were undertaken for the proposed tower access road. In the surveyed areas of Range 62, three live tortoises were observed in burrows along with fresh tracks of a fourth tortoise. A total of 41 burrows, 14 potential burrows, 13 pallets, 14 scats, 2 carcasses, and 2 sets of desert tortoise tracks were observed during the June 2002 survey. The survey did not locate any desert tortoise or active burrows in the areas examined in Range 64 (USFWS 2003).

In summary, the accumulated results of these surveys establish that the affected areas under Proposed Action One have a minimal (at most) potential to support desert tortoise. Most of the habitat is already disturbed, and that over the 12-year period of surveys, no evidence has shown improvement of the habitat quality or increase in tortoise population density. As such, the surveys support the USFWS 2003 Biological Opinion that continued training activity at NTTR would not jeopardize the continued existence of the desert tortoise and would not be likely to destroy or adversely modify designated critical habitat

This USFWS programmatic BO, issued on June 17, 2003 (amending the earlier Biological Opinion issued February 5, 1997), also concluded that training activities at NTTR would not jeopardize the continued existence of the desert tortoise or destroy or adversely modify critical habitat. For the NTI project, this Opinion allowed the accidental take of two desert tortoises, the removal of twenty tortoises from impact zones or roads, an unknown number of desert tortoise eggs disturbed or destroyed, and a loss or further degradation of 971 acres of previously-disturbed habitat. The Opinion also indicated measures to be taken to minimize desert tortoise mortality or harassment and destruction of habitat. Measures include a maximum speed limit of 35 miles per hour for all regular vehicle travel except during periods of high desert tortoise activity, no off-road travel with the exception of Explosive Ordnance Disposal (EOD), presence of a qualified desert tortoise biologist during EOD activities, removal of desert tortoise areas of impact by a qualified biologist, installation of tortoise-proof fencing around high risk areas, and development of an approved vegetation rehabilitation plan.

Additional state and federal species of concern may occur on NTTR (see Appendix A). This status category does not confer any specific legal protection, but the Nellis Environmental Management

Directorate gives consideration to species of concern in ongoing management of the range and as part of NEPA compliance.

Species of concern and BLM-sensitive species that are known or likely to occur on NTTR include seven species of mammals (six of which are bats), eight species of birds, and two species of reptiles (see Appendix A). According to the bird survey report (Air Force 1997b), a majority of these avian species are expected to occur on NTTR only seasonally in small numbers. The phainopepla is the only common year-round resident, and burrowing owl and ferruginous hawk may breed on NTTR in small numbers.

Due to the lack of small mammal surveys, there is no evidence concerning the presence of the pygmy rabbit on NTTR. A bat survey report (Air Force 1999c) documents the presence of three sensitive species of bats on NTTR, Townsend's big-eared bat, fringed myotis, and long-legged myotis. Other bat species such as the western small-footed myotis, spotted bat, and the long-eared myotis have been observed on the Department of Energy's Nevada Test Site and are likely to occur on NTTR.

***Environmental Consequences.*** No rare plants are known (TNC 1997) to occur within approximately 0.5 miles of the proposed areas for construction, therefore, no impacts would be likely. The species located within a mile of the sites is Merriam's bearpaw poppy.

Potential impacts to wildlife species of concern from construction and operation would be minimal. Construction would affect critical habitat to these species and the effects of noise and dust would be temporary. Operations, both aircraft and maintenance, would not change measurably from existing conditions.

Only one federally-listed threatened wildlife species, desert tortoise, occurs within NTTR and potentially within the areas affected by Proposed Action One. Neither Alternative 1A nor Alternative 1B would be expected to adversely affect desert tortoise populations or their recovery. Several factors support this assessment:

1. While the areas potentially affected by either Alternative 1A or 1B fall within the habitat range of the desert tortoise, the USFWS does not consider these areas to be critical habitat nor would the activities associated with NTI likely affect critical habitat (USFWS 2003). In addition, the potentially affected areas within NTTR (South Range) lie at the northern limits

of the tortoise range where population densities are "patchy" (Revegetation Innovations 1992).

2. Due to past disturbance and ongoing training activities, most, if not all of the affected area consists of unsuitable habitat (USFWS 1992). The proposed HTTC locations both lie within existing ordnance impact zones. Four of the 38 proposed WISS and emitter sites contain existing facilities and disturbance. Proposed road upgrades would predominately follow existing road corridors, with only 8 and 10 miles of new roads in the South Range under Alternatives 1A and 1B, respectively.
3. Surveys conducted in June 2002 in the proposed HTTC and associated facilities for Alternative 1A and 1B indicate the presence of few desert tortoises. In addition, numerous surveys throughout the valleys containing the alternatives indicate that desert tortoise populations are low to very low.
4. Based on the survey data, the past and continuing training use of the areas, and the existing facilities and targets, it is not reasonable to assume that desert tortoise habitat in the affected areas would have improved or that tortoise populations would have increased.

The proposed HTTC and associated facilities have been fully reviewed and considered in the 2003 USFWS Biological Opinion. This Opinion was based on a review of both the proposed activities associated with NTI and programmatic activities proposed on NTTR over a 16-year period. The Air Force would comply with the requirements of the Biological Opinion. Upon selection of an alternative the Air Force would provide a qualified desert tortoise biologist to conduct pre-construction clearance surveys and continued monitoring for desert tortoise during construction. Both construction and range personnel would receive Tortoise Awareness Training to educate them on the correct procedures to be followed if tortoises are encountered. Any desert tortoise found would be relocated, and nearby burrows excavated and collapsed by a biologist. In addition, fences may need to be constructed around disturbance areas to prevent transient tortoises from entering. A maximum speed of 35 miles per hour during the tortoise's active season (March 1 through October 31) would apply.

Under the no-action alternative there would be no change to current baseline conditions. There would be no impacts to threatened and endangered species or species of concern.

**Proposed Action Two**

***Existing Conditions.*** Habitat on the existing lands for the Security Forces training site is highly disturbed creosote shrubland, but falls within the overall range of desert tortoise habitat. Areas within ISAFAF and the adjacent ISAFAF-owned property are considered developed and inappropriate to support habitat for species of concern. Due to the disturbed nature of the habitat at all of these locations, threatened, endangered, or other species of concern are unlikely to be resident or transient.

***Environmental Consequences.*** As noted above, the affected areas for Alternatives 2A and 2B consist of previously developed and disturbed locations. These locations are very unlikely to support threatened or endangered species or species of concern. Impacts to such species would be negligible to non-existent.

Under the no-action alternative, there would be no change to current baseline conditions. No new construction, upgrades, or training operation would occur and no impacts to threatened, endangered, or other special status species would occur.

***Combined Environmental Consequences for Both Proposed Action One and Proposed Action Two.*** Combined impacts would be limited to potential loss of desert tortoise habitat and individuals. However, due to the low concentration of this species on the South Range, surveys of impacted areas, and compliance with measures required by the Biological Opinion, these impacts would be negligible.

## 3.4 CULTURAL RESOURCES

Cultural resources are districts, sites, buildings, structures, or objects considered to be important to a culture, subculture, or community for scientific, traditional, religious or any other reason. For this EA, cultural resources are divided into three major categories: archaeological resources, architectural resources, and traditional cultural resources. Cultural resources in all three categories could occur in the affected environment of Proposed Action One and Two.

*Archaeological resources* are locations where human activity has measurably altered the earth (e.g., hearths, rock alignments, foundations) or left deposits of physical remains (e.g., arrowheads, bottles). For the purposes of this EA, the terms "American Indian" and "early American Indian" are used rather than prehistoric, except where a law or regulation is quoted. The distinction between early American Indian and historic time periods is now viewed as somewhat arbitrary and many American Indians do not distinguish "prehistoric" from "historic." "Historic" applies to archaeological sites that clearly post-date Euroamerican contact with American Indians (i.e., 19th and 20th centuries). Archaeological resources are usually further classified as either sites or isolates on the basis of quantity, density, and type of cultural material.

*Architectural resources* are defined as standing buildings, facilities, and other structures potentially having historical, aesthetic, or scientific significance.

*Traditional cultural resources* are resources associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. In Nevada, these are usually associated with modern American Indian groups.

Under the National Historic Preservation Act and various federal regulations, only significant cultural resources are considered when assessing the possible impacts of a federal action. Significant cultural resources include those that are eligible or are recommended as eligible for inclusion in the National Register of Historic Places (National Register). The significance of archaeological and architectural resources is usually determined by using specific criteria (listed in 36 CFR 60.4). Traditional cultural resources can be evaluated for National Register eligibility as well. However, even if a traditional cultural resource is determined to be not eligible for the National Register, it may still be significant to a particular Native American tribe. Such resources may be protected under the Native American Graves Protection and Repatriation Act, the American Religious Freedom Act, and Executive Order 13007 that addresses sacred Indian sites. The significance of a Native American traditional cultural property is determined by consulting with the appropriate Native American tribes.

The affected environment for cultural resources for Proposed Action One includes the areas proposed as locations for WISS sites; threat emitters; HTTC; road, power, and fiber optic upgrades, and new construction; convoy roads and maintenance areas; well sites; and a new command and control center at Point Bravo. The MOUT facility location and the construction and upgrades of facilities on the ISAFAF and the ISAFAF property south of U.S. Highway 95 make up the affected area for Proposed Action Two.

The Air Force has responsibility for Section 106 actions on NTTR. On the South Range lands within the Desert National Wildlife Range (DNWR), the USFWS jointly holds responsibility for Section 106 and Section 110 activities and Native American Graves Protection Repatriation Act consultation. Archaeological surveys in the South Range were performed under Federal Archaeological Permit DWR-2001-1 and a special use permit from the DNWR.

Methods for determining the presence of NRHP-eligible cultural resources within the affected environment were based on existing data and on an archaeological inventory of the affected area in Proposed Action One. For Proposed Action One, 2,371 acres of the potentially affected environment were inventoried by professional archaeologists (Air Force 2001b) using the field guidelines derived from the NTTR Cultural Resources Management Plan (CRMP). These inventories were conducted at NTTR in September and October, 2001 in both the North and South Ranges. Other areas, including the ISAFAF and the property across U.S. Highway 95, were inventoried previously (NAFB 1998, Air Force 1997a) and these existing data were used to identify NRHP-eligible resources in the potentially affected environment.

Consultation between the Air Force and local American Indian tribes was handled as part of Nellis AFB's Native American Interaction Program. This program, which includes 18 tribes and tribal organizations in a four-state area, selects American Indian monitors who accompany archaeologists, identify and evaluate resources, and review environmental documents as part of regular formal and informal consultation. Their observations and comments were incorporated into the cultural resources inventory report associated with the NTI (Air Force 2001b).

### 3.4.1 Proposed Action One

***Existing Conditions***. Under the two action alternatives for Proposed Action One, an HTTC, convoy road and maintenance area, roads, powerlines, and fiber optic cables would be constructed or upgraded at either Range 64 (Alternative 1A) or at Range 62 (Alternative 1B). Roads, WISS sites, powerlines, and fiber optic cables (both above- and below-ground) would also be constructed for both alternatives. For the action alternatives, archaeological inventories were conducted for 41 sites that included the 1-acre threat emitters, WISS sites and wells; over 78 miles of new and existing roads and adjacent powerlines and fiber optic cables; two approximately 640-acre HTTC sites; and two 40-acre convoy maintenance areas (Air Force 2001b). A total of 20 archaeological sites were recorded or re-evaluated during the survey.

Archaeologists used diagnostic attributes and ethnic traits, affirmed through scientific studies, to type and interpret sites. Sites with glass, cans, and milled lumber are traditionally considered historic in origin and use. Recent studies by Nellis AFB archaeologists in the Kawich Range indicate that many sites considered Euroamerican in origin were instead created and used by Native Americans are in revision as ethnohistoric. Thus the following discussions of historic sites do not consider Euroamericans as the exclusive users, and, in fact, may be determined ethnohistoric with the addition of regional studies presently funded by the Air Force.

Sixteen of the 20 recorded sites were prehistoric and 4 were historic in origin. In addition to the recorded sites, a total of 36 isolated artifacts were noted during the inventory. Isolated artifacts are not considered to be NRHP-eligible resources. Out of 20 sites, one, the Gold Reed mining camp, was unevaluated to the NRHP. The Nevada SHPO has concurred with these findings (Appendix E). Due to the size of this site, Nellis AFB continues the process of completing its evaluation. The eligibility of the Gold Reed site will be deferred, and the property treated by the Air Force as eligible until the evaluation is completed. No traditional cultural properties nor any architectural resources that could be eligible to the NRHP were identified at any of the surveyed areas. Table 3.4-1 presents the number of cultural resources found and the number of NRHP-eligible resources located in the affected environment for the two action alternatives of Proposed Action One.

**Table 3.4-1 Cultural Resources in Proposed Action One's Affected Environment**

| ***Project Components*** | ***Alternative 1A (R64)*** | | ***Alternative 1B (R62)*** | |
|---|---|---|---|---|
| | Number of Cultural Resources | Number of NRHP-eligible resources | Number of Cultural Resources | Number of NRHP-eligible resources |
| HTTC | 2 sites; 5 isolates | 0 | 2 sites; 4 isolates | 0 |
| Moving Convoy | 1 site; 1 isolate | 0 | 0 sites; 0 isolates | 0 |
| TOSS to WISS sites | 1 site; 0 isolates | 0 | 1 site; 0 isolates | 0 |
| Threat emitters | 1 site; 0 isolates | 0 | 1 site; 0 isolates | 0 |
| New WISS sites | 0 sites; 0 isolates | 0 | 0 sites; 0 isolates | 0 |
| Wells | 0 sites; 0 isolates | 0 | 0 sites; 0 isolates | 0 |
| Roads, power, fiber upgrades | 13 sites; 26 isolates | 1 | 13 sites; 26 isolates | 1 (deferred) |

In Proposed Action One, a new command and control facility would be constructed at the Point Bravo SRCC. Point Bravo is a heavily developed and disturbed area. The portion identified for construction of the facility has been graded and previously used as a loading dock. Because of prior disturbance, no archaeological survey was conducted in this area.

***Environmental Consequences***. Procedures for assessing adverse effects to cultural resources are discussed in regulations for 36 CFR 800 of the NHPA. An action results in adverse effects to a cultural resource eligible to the NRHP when it alters the resource characteristics that qualify it for inclusion in the register. Adverse effects are most often a result of physical destruction, damage, or alteration of a resource; alteration of the character of the surrounding environment that contributes to the resource's eligibility; introduction of visual, audible, or atmospheric intrusions out of character with the resource or its setting; and neglect of the resource resulting in its deterioration or destruction; or transfer, lease, or sale of the property.

Proposed Action One has potential to affect one cultural resources property during construction of facilities, grading roads, or excavating for fiber optic cables. No NRHP-eligible architectural or traditional resources were identified within the affected environment for Proposed Action One. One archaeological site, the Gold Reed mining camp, that is associated with both Alternative 1A and 1B, is unevaluated to the NRHP. Potential impacts to this site could occur from the linear excavations associated with burying fiber optic cables adjacent to an existing road which runs through the middle of the site. However, construction disturbance would be restricted to an area within 15 feet north of the existing road and the cables could be placed on above-ground poles to limit potential impacts. This narrow impact area would avoid historic dugouts and structures, two features that could potentially yield additional scientific information and make the site eligible to the NRHP. By avoiding these features, no adverse effects would occur to those characteristics of the site that could make it eligible, and no adverse effects to the site would result. The Nevada SHPO concurs "that the undertaking will not pose an adverse effect" to Gold Reed.

Under the no-action alternative, no HTTC, command facility, convoy, maintenance area, powerlines, fiber optic lines, or roads would be constructed or upgraded. There would be no impact to NRHP-eligible or listed resources.

### 3.4.2 Proposed Action Two

***Existing Conditions***. Under Proposed Action Two, the MOUT would be constructed at Range 63A and existing buildings or construction of new buildings would accommodate the associated facilities, classrooms, and infrastructure at ISAFAF. Four additional facilities would be constructed at ISAFAF (portions of Alternative 2A) or on adjacent property (portions of Alternative 2B).

An archaeological inventory was conducted at the MOUT facility (Air Force 2001b). No archaeological sites or isolated artifacts were recorded within this heavily disturbed area.

An intensive archaeological survey of the ISAFAF and nearby property across U.S. Highway 95 was completed in 1995 (York *et al.* 1996). The Nevada SHPO concurred with the determination of no eligible sites. In addition, no NRHP-eligible World War II-era structures have been identified on ISAFAF (SHPO 1996). Traditional cultural properties have not been identified in these areas.

***Environmental Consequences***. No NRHP-eligible archaeological, architectural, or traditional resources have been identified within the MOUT or the areas of ISAFAF and adjacent ISAFAF property. Therefore, construction and upgrading of facilities associated with Proposed Action Two would not have an adverse effect on significant cultural resources.

Under the no-action alternative, no MOUT facilities or associated buildings would be constructed or upgraded. There would be no impact to NRHP-eligible or listed resources.

***Combined Environmental Consequences from both Proposed Action One and Proposed Action Two.*** No adverse impacts to NRHP-eligible or listed resources would occur under the action alternatives for Proposed Action One or Proposed Action Two. Therefore, if both proposed actions were implemented, no adverse effects to these resources would be expected.

## 3.5 SOILS AND WATER RESOURCES

NTTR soils have been evaluated for general soil associations; specific soils have not been mapped in detail. General descriptions of soils series are available from the U.S. Department of Agriculture (USDA). In summary, soils at NTTR consist of the following. The St. Thomas series, consisting of shallow, well-drained soils that formed in colluvium and residuum from limestone and dolomite are the primary soil types found in the mountains. These soils generally occur on hills and mountains with 8 to 75 percent slopes. The Crosgrain and Arizo soils series are the primary soil types of the fan piedmonts. The Crosgrain series are shallow, well-drained soils that formed in mixed alluvium on ballenas (old fan piedmonts), with slopes 4 to 30 percent. The Arizo series are very deep excessively drained soils that formed in mixed alluvium on recent alluvial fans, with slopes of 0 to 15 percent (Air Force 1999b).

The basin floors generally consist of Mazuma and Ragtown soil series. The Mazuma series are very deep, well-drained soils that formed in alluvium and lacustrine materials from mixed rock sources. Mazuma soils occur on fan skirts and alluvial flats, with slopes of 0 to 15 percent. The Ragtown soil series are very deep, moderately well-drained soils that formed in fine-grained, lacustrine materials from mixed rock sources. This series occurs on lake plain terraces with slopes 0 to 4 percent (Air Force 1999b).

The alluvial soils that dominate the fans and basins, in conjunction with the fine soil particles from lacustrine sources are subject to excessive wind erosion. These fined-grained materials are often entrained into the airstream and can result in fugitive dust (refer to section 3.2 for discussion of fugitive dust emissions).

The scarcity of surface water resources on NTTR is attributed to a dry regional climate characterized by low precipitation, high evaporation, low humidity, and wide extremes in daily temperatures. Average precipitation depends mainly on elevation and ranges from 4 inches on the desert floor to 16 inches in the mountain areas. With the exception of locally intense thunderstorms that can produce flash flooding, much of the warm weather precipitation is lost to the atmosphere through evaporation and transpiration. Within the arid area of NTTR, the availability of moisture in excess of evaporation and transpiration is so limited that few perennial surface water features are present. With the exception of man-made ponds and catchments, the only perennial surface water comes from springs that form where ground water intersects the surface. The springs flow for short distances on the ground surface, which is underlain by bedrock. Most surface water is temporarily present as a result of ponding in low permeability playas and as ephemeral channel flow from infrequent precipitation and snowmelt runoff. Playas are not major recharge zones due to the low infiltration potential. Most surface water that reaches the playas is lost through evaporation.

Criteria for water quality within the State of Nevada are contained in the Nevada Administrative Code (NAC), Chapter 445A.119, and apply to existing and designated beneficial uses of surface water bodies. Water quality standards are driven by the beneficial uses of specific water bodies. Beneficial uses include agriculture (irrigation and livestock watering), aquatic life, recreation (contact and non-contact), municipal or domestic supply, industrial supply, and wildlife propagation. There is a three-tiered system of beneficial use designation of surface water resources within the NAC depending upon the size of the water body.

1. Major water bodies or rivers are specifically designated by name (in some cases by reach) and are assigned numeric standards (NAC Sections 445A.145 to 445A.225) or thresholds as well as anti-degradation criteria.

2. Smaller water bodies are classified (i.e., Class A, B, C, and D) as to the condition of the waters "as affected by discharges relating to the activities of man." Water quality standards are specified for each of the water classifications (NAC Sections 445A.124 to 445A.127).

3. Other surface waters are protected by generic standards that apply to all waters of the state (NAC Section 445A.121).

Due to the transient occurrence of surface water within the arid region of NTTR, there are no bodies of surface water present that are designated as to specific beneficial uses (i.e., categories 1 or 2 above). All surface water (e.g., ephemeral streams) within the range are regulated and protected under the standards applicable to all waters of the state (i.e., category 3). However, the regulations allow for the classification of a body of public water not currently classified in the NAC if there is a permit request to discharge into that body of water. Additionally, beneficial uses of surface water on NTTR (e.g., livestock or wildlife watering, domestic supply, etc.) would be subject to water quality criteria or standards specific to the use (e.g., drinking water standards for domestic supply).

The State of Nevada has adopted drinking water standards established by the USEPA, under the Safe Drinking Water Act. The Nevada Department of Health regulates drinking water quality for public supply systems. Drinking water standards consist of maximum contaminant levels (MCLs) established for various water quality constituents. Primary MCLs are established to protect against adverse health effects and are enforced for public drinking water supplies. Secondary MCLs are established for aesthetic reasons such as taste, color, or odor and are not enforceable on public drinking water supplies. Thresholds are established for selected constituents that, if exceeded by a specified percentage of samples (based on the number of people served), require treatment of the water source prior to distribution to users of the supply system.

### 3.5.1 Proposed Action One

***Existing Conditions.*** Alternatives 1A and 1B lie in the southern end of the Pintwater (Alternative 1A) and Desert (Alternative 1B) mountain ranges, chiefly in the southern portions of Indian Springs and Three Lakes valleys. Mountain ranges are generally north trending, upward thrust fault blocks, composed primarily of Paleozoic carbonate rocks separated by narrow valleys. Between the mountains and valley floors, are gently sloping bajadas or piedmonts composed of coalescing alluvial fans. In the upper reaches, the bajadas are composed of poorly sorted, gravely to cobbly alluvium, that grades to finer material near the valley floors.

The lower reaches of the bajadas extending north to the Indian Spring and Three Lakes Valleys are mantled with carbonate-rich eolian silt varying in thickness from less than 20 centimeters to greater than 4 meters. The bajada surfaces usually support desert pavement. In the affected environment for Alternatives 1A and 1B, soils range from well developed on the upper bajadas to poorly developed near and on the valley floor. Both alternatives (1A and 1B) as well as their associated facilities and infrastructure are located in areas with relatively little slope (e.g., valleys with 0 to 5 percent).

The affected environment for Proposed Action One lies within an arid setting where the annual rainfall seldom exceeds 7.1 inches, with the majority falling in the winter months (Air Force 1997a). There are no perennial streams, waterways, or permanent bodies of water in the area, only ephemeral washes. Infrequent storm water runoff has been known to cause minor flooding at the Indian Springs area, however, surface runoff from brief storm events is channeled through natural drainage and quickly infiltrates the coarse grain alluvium of the bajadas. Rare surface water runoff that does reach the lower elevations accumulates in playas and is lost to evaporation.

Water sources for the HTTCs during construction and occasional maintenance would consist of permitted water use from wells near either alternative location. For the SRCC at Point Bravo, water at Point Bravo is drawn from a well; the Air Force is permitted to draw 10 million gallons per year (mgy). In 1997, only 7.4 mgy were used or about 74 percent of capacity (Air Force 1998a).

***Environmental Consequences.*** Construction and ground-disturbing activities under Alternative 1A would take place on approximately 869 acres in Range 64. Under Alternative 1B construction and ground disturbing activities would take place on 946 acres within Range 62. Under Proposed Action One, the HTTC, convoy road and maintenance area, emitters, scoring sites, new command and control cent at Point Bravo, and supporting infrastructure would be constructed in four phases over 4 years.

The soil erosion potential from water and wind for construction for either alternative would be generally slight to moderate due to the type of soil as well as slight slope found at these proposed locations. Construction activities would involve removal of vegetation and soils as well as grading. These activities would expose underlying soil to wind (see section 3.2) and water erosion. Erosion from water could result in sedimentation in the ephemeral washes or surface impoundments. However, best management practices, such as proper grading, stabilization, culverts to channel storm water runoff, and watering roads to limit fugitive dust would minimize soil erosion. In addition, the arid climate found at NTTR as well as distribution of construction activities over a 4-year period would further minimize erosional impacts.

The area of disturbance for Proposed Action One would be greater than 5 acres, therefore, it is subject to conditions of National Pollutant Discharge Elimination System (NPDES) permits. Nellis AFB would amend their existing NPDES permit to accommodate facility construction. The existing Storm Water Pollution Prevention Plan (SWPPP) would need to be updated prior to construction and would specify BMPs to reduce or eliminate significant erosion and sedimentation impacts.

Operation of the SRCC at Point Bravo would be conducted by the existing 25 contractors at Point Bravo and up to six contractors could be moved from the Tolicha Peak facility to support the added activities of the HTTC. These six personnel, when added to the existing staff, would not place significant demands on water. Current demand is only 74 percent of capacity and with the addition of up to six staff, consumption would increase by only 4 percent (or about 156,000 gallons per year, based on an average of 100 gallons per day, times 6 people, for 260 days).

Under the no-action alternative, ongoing Air Force and interagency programs and activities at NTTR would continue operating at current levels as reflected in current Air Force management plans. These plans include recent activities that have been approved by Air Force and have existing NEPA documentation. Under the no-action alternative, Proposed Action One would not be implemented but NTTR would continue to manage its natural resources in accordance with state and federal regulations. No additional impacts to soil or water resources would occur.

**Proposed Action Two**

***Existing Conditions.*** The existing facilities at the MOUT site (Range 63A) and locations of the ISAFAF and the Air Force-owned property at Indian Springs (refer to Figure 2-11), are geographically located in the South Range (similar to those conditions described for Alternatives 1A and 1B in section 3.5.1). The Security Forces' existing training area has measures in place to control erosion and sedimentation. The construction and renovations that would be made under either Alternative 2A or 2B at the ISAFAF would be in addition to existing missions that are currently managed with ongoing BMPs, NPDES permit, and SWPPP. The ISAFAF-owned property south of U.S. Highway 95 is being used for religious (a chapel is being leased by a local group) as well as Security Forces administrative and housing purposes and has existing BMPs (culverts and proper storm water runoff channels) to manage erosion and sedimentation to open waterways adjacent to the property (Air Force 1997a).

Water is provided to ISAFAF from three wells: 62-1, 106-2, and ISAFAF No. 3. There are a total of 62.7 mgy of ground water permitted for Air Force use at these sources (Air Force 1998a). Of the 62.7 mgy, the Air Force used only 31.7 mgy in 1997, or 79 percent of its total capacity (Air Force 1998a) for municipal and industrial uses. At the Security Forces site in Range 63A, current permitted use from the SFA well is 1.5 mgy. In 1997, only 329,000 gallons were consumed, or only 22 percent of its current total capacity.

Wastewater at ISAFAF is treated on site at an Air Force-operated wastewater treatment facility. The facility has the capacity to treat 2.7 million gallons per month and typically treats approximately 0.8 million gallons per month, about 30 percent of capacity. The treatment facility is permitted by the State of Nevada under a groundwater discharge permit number Nev. 60030 (Air Force 1997a).

***Environmental Consequences.*** Construction and ground-disturbing activities for the MOUT under both alternatives would occur on approximately 94.3 acres located within the South Range of NTTR. Under Alternatives 2A and 2B, 3.7 acres would be disturbed due to renovations and construction at ISAFAF and the adjacent ISAFAF-owned property across (just south of) U.S. Highway 95 (refer to Figure 2-12).

The soil erosion potential from water and wind for construction for either alternative (2A and 2B) would be generally slight to moderate due to the type of soil as well as slight slope found at these proposed locations. Construction activities would involve removal of a minimal amount of vegetation and soils as well as grading. These activities would expose underlying soil to wind (see section 3.2) and water erosion and could result in sedimentation in surface impoundments. However, BMPs such as proper grading, stabilization, culverts to channel storm water runoff, and watering construction sites to limit fugitive dust, would minimize adverse effects.

Under Proposed Action Two, the construction of the MOUT and the building of new facilities at either ISAFAF (Alternative 2A) or at the adjacent ISAFAF property (Alternative 2B) would occur during FY04. Since the area of disturbance for this action would be greater than 5 acres, it would be subject to conditions of existing NPDES permits. The existing SWPPP would need to be updated to reflect these new facilities and be prepared prior to construction. The SWPPP would specify measures to reduce or eliminate any adverse erosion and sedimentation impacts (e.g., culvert and storm water runoff drainage).

In addition, fugitive dust would be reduced during construction through soil watering, gravel, and proper grading to minimize any affects from this resource.

Operation of the MOUT would not change significantly from current levels. The number of trainees would remain at about 2,300 students per year, however, the number of instructors could increase by two full-time equivalents (or 160). These trainees and instructors would still be based out of Nellis AFB or would be on temporary duty assignment for the duration of the training program. Potential impacts of MOUT training activities to public utilities at ISAFAF, at either alternative location, would be negligible. Water use and wastewater discharge would not change substantially because there would only be a two-person increase from existing levels.

Under the no-action alternative, ongoing Air Force and interagency programs and activities at NTTR would continue operating at current levels, Proposed Action Two would not be implemented. NTTR would continue to manage its soils and water resources in accordance with state and federal regulations. Therefore, conditions would remain similar to those found at this time.

***Combined Environmental Consequences from Both Proposed Action One and Proposed Action Two.*** If both proposed actions were undertaken at the same time, soil disturbance would be a maximum of 1,043 acres. Because both actions are geographically separated, and proper construction measures would be undertaken to limit erosion, the potential for adverse effects to soil and water resources would be negligible. Water use and wastewater treatment would not change measurably or exceed capacities.

## 3.6 SOCIOECONOMICS

This section addresses the general features of the local Indian Springs economy that may be affected by the proposed actions. The analysis focuses on Indian Springs since neither of the proposed actions change personnel or expenditures elsewhere in the region. Further, any impacts in the Las Vegas area would be negligible given the size and robustness of the Las Vegas area economy and the relatively minor expenditures associated with the proposed actions.

### 3.6.1 Proposed Action One

***Existing Conditions.*** Indian Springs is an unincorporated community located in Clark County, approximately 50 miles northwest of Las Vegas. It is the only community in the northwest section of Clark County and is bordered entirely by Bureau of Land Management and withdrawn military lands.

Indian Springs has several small commercial establishments that provide for the needs of the local community and for highway traffic travelling in this remote area. The community has gas stations, a small market, casino/restaurant, public library, community center, fire station, and schools. The majority of the housing is mobile, wheeled trailers and mobile homes. The population of the community is 1,164 (Indian Springs 2002).

The primary economic influence in the area is the ISAFAF and other Department of Defense and Department of Energy range and facility operations in the region. The population and economic base of the community are directly affected by changes associated with the missions and activities of the Air Force at ISAFAF, the southern ranges, and the Department Of Energy at the Nevada Test Site. The State Southern Desert Correctional Center and Indian Springs Conservation and Boot Camps just south of Indian Springs provide additional influence on the local economy through employees and inmate visitors as does a small amount of agricultural activity (Air Force 1997a).

Indian Springs is the only community in close proximity to Proposed Action One. A review of U.S. Census data indicated that there are no concentrations of population near the Indian Springs area other than the town itself. Amargosa, an unincorporated town 40 miles to the northwest, has a population of about 1,200 (Clark County 2002). The closest geographic area with a significant population is the Las Vegas urban valley, approximately 50 miles south with a population of over 1.4 million (Clark County 2002). This metropolitan area of Clark County is one of the fastest growing regions in the country, with annual rates of growth of about 5 to 6 percent (Air Force 1999b).

***Environmental Consequences.*** Under both action alternatives, construction of the HTTC and associated facilities and infrastructure would occur in four phases over the course of 4 years. Given that the difference between the two alternatives is that the primary facilities would be located either at Range 64 (Alternative 1A) or at Range 62 (Alternative 1B), the impacts to the local Indian Springs economy would be the same.

Construction activities over the 4 years may employ local workers who would commute daily from Las Vegas, or those who might temporarily relocate to Indian Springs on a short-term, temporary basis. These workers would, in turn, purchase goods and services in the local economy. However, the total input into the economy would be easily absorbed by the community since it would be spread over 4 years and be of a short-term, temporary basis. The majority of construction materials would be purchased outside the local region and transported to the site, resulting in negligible local impacts. Overall, construction activities would result in minor positive impacts to the Indian Springs economy. Any construction impacts experienced in the Las Vegas area economy would be insignificant given the size and diversity of the Las Vegas metropolitan area economy.

Aircraft operations associated with the HTTC would involve flight crews based at Nellis AFB or personnel on temporary duty assignment at Nellis AFB. There would be no increase in the number of permanent or temporary personnel at Nellis AFB as a result of Proposed Action One. Maintenance of HTTC facilities would be conducted by existing contractors at ISAFAF, there would be no new employment positions created. Up to 6 contractors may be relocated from the Tolicha Peak facility to the Point Bravo Command and Control Center, however, these would not represent new positions. Therefore, operation of the HTTC and associated facilities would not result in impacts related to a change in employment or population in the area.

There would be no change to existing socioeconomic conditions under the no-action alternative (1C).

### 3.6.2 Proposed Action Two

***Existing Conditions.*** The existing conditions would be the same as described for Proposed Action One, the MOUT and associated facilities would all be located within Clark County at R63A or in Indian Springs.

***Environmental Consequences.*** Under both alternatives, construction of the MOUT, its associated facilities, and infrastructure would occur over 5 years. Given that the only difference between the two action alternatives is that the lodging, classroom, dining, and kennel facilities would be located either at ISAFAF or at the adjacent ISAFAF-owned property, the impacts to the local economy would be the same.

Construction activities over the 5 years could employ local workers and may also employ those who would commute daily from Las Vegas or might temporarily relocate to Indian Springs. These workers would, in turn, purchase goods and services in the local economy. However, the total input into the economy would be easily absorbed by the community since it would be spread over 5 years and be of a short-term, temporary basis. The majority of construction materials would be purchased outside the local region and transported to the site, resulting in negligible local impacts. Overall, construction activities would result in minor positive impacts to the Indian Springs economy. Any construction impacts experienced in the Las Vegas area economy would be insignificant given the size and diversity of the Las Vegas metropolitan area economy.

Operation of the MOUT complex would involve invited guests, trainees, and instructors visiting the facility. It is anticipated that two, full-time additional permanent positions (for a total of 160 instructors) at Nellis AFB would be generated in Indian Springs to support training activities. Maintenance of the MOUT would be conducted by existing contractors, there would be no new employment positions created. Therefore, operation of the MOUT would not result in negligible impacts related to a change in employment or population in the area.

Approximately 2,300 students and 1,600 instructors would attend the MOUT each year in 10 separate training sessions for a 14-day period. Students and instructors would stay and eat in the provided Air Force lodging and dining facilities. These personnel would, however, also be expected to occasionally visit local dining, entertainment, and retail establishments. These expenditures would result in minor positive impacts to the local economy.

There would be no change to existing socioeconomic conditions under the no-action alternative. No construction or additional expenditures would occur.

***Combined Environmental Consequences From Proposed Action One and Proposed Action Two.*** Implementing both proposed actions simultaneously would not result in negative socioeconomic impacts to the Indian Springs area. Additive minor, positive impacts would result from construction and personal spending over a period of about 5 years and the local Indian Springs economy would be able to accommodate these short-term, temporary inputs into the community.

## 3.7 NOISE

The potential effects of aircraft noise from any aircraft, including the multiple types of aircraft flown in NTTR, warrant consideration in this environmental analysis. Given the emphasis on construction in both the proposed actions, localized construction noise also receives attention.

Noise is often defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, diminishes the quality of the environment, or is otherwise annoying. Response to noise varies by the type and characteristics of the noise source, distance from the source, receptor sensitivity, and time of day. Noise can be intermittent or continuous, steady or impulsive, and it may be generated by stationary or mobile sources. Although aircraft are not the only source of noise in any area, they are readily identifiable to those affected by their noise emissions and are routinely singled out for special attention and criticism. The kind of noise discussed in this section is conventional subsonic noise as generated by an aircraft's engines and airframe. This noise is heard while an aircraft is within some distance of a receptor (e.g., person).

Assessment of subsonic aircraft noise requires a general understanding of the measurement and effects of this kind of noise. Appendix C contains additional discussion of noise, the quantities used to describe it, and its effects.

Noise is represented by a variety of quantities, or "metrics." Each noise metric was developed to account for the type of noise and the nature of receptor of the noise. Human hearing is more sensitive to medium and high frequencies than to low and very high frequencies, so it is common to use "A-weighted" metrics, which account for this sensitivity.

Time also plays a role with regard to noise. Because people hear a sound, such as an aircraft flyover, at a given time, they think the noise is instantaneous. However, the effects of noise over a period of time depend on the total noise exposure over extended periods, so "cumulative" noise metrics are used to assess the impact of ongoing activities.

Within this EA, noise is described by the Onset Rate Adjusted Monthly Day-Night Average Sound Level ($L_{dnmr}$). $L_{dnmr}$ is the measure used for subsonic aircraft noise in military airspace like that overflying NTTR. This metric accounts for the fact that when military aircraft fly low and fast, the sound can rise from ambient to its maximum very quickly. Known as an onset-rate, this effect can make noise seem louder than its actual level. Penalties of up to 11 dB are added to account for this onset rate.\

### 3.7.1 Proposed Action One

***Existing Conditions***. Under Alternative 1A the HTTC, associated facilities, and infrastructure would be constructed on lands underlying the airspace unit (Restricted Area R-4806) where baseline subsonic noise levels range from 53 to 55 $L_{dnmr}$. Under Alternative 1B the HTTC, associated facilities, and infrastructure would be constructed on lands underlying airspace units with subsonic noise levels also ranging from 53 to 55 $L_{dnmr.}$ The variation in baseline noise levels reflects the range of baseline sortie-operations in the airspace. Baseline noise levels and sortie-operations, as analyzed in the F-22 Force Development EIS (Air Force 1999a), are provided in Table 3.7-1.

**Table 3.7-1 Baseline Noise Levels ($L_{dnmr}$) for NTTR**

| *Airspace Unit* | *28,000 Sortie-Operations* | *42,000 Sortie-Operations* |
|---|---|---|
| ***Alternative 1A*** | 53 | 55 |
| ***Alternative 1B*** | 53 | 55 |

***Environmental Consequences***. Under either action alternative (1A or 1B) sortie-operations (Air Force 1999b) would not change, nor would supersonic events increase. Aircraft would enter and transit the airspace units similarly to current mission events (generally in a north or south pattern or at high altitude). The placement of the HTTC in a valley under either alternative would not entice aircraft to traverse across (east or west) the mountain ranges. Either valley is too narrow for aircraft to fly over the mountains, acquire the targets, and deliver the actual or simulated ordnance before reaching the other side of the valley. Therefore, no changes to aircraft-generated noise levels (subsonic or supersonic) are anticipated and conditions presented in the Nellis Renewal FEIS (Air Force 1999b) and the F-22 Force Development EIS (Air Force 1999a) would remain the same.

Short-term localized noise increases due to construction and upgrades, as well as infrastructure (roads, cable and fiber optic lines) installment and realignment would occur. Construction would occur in stages (in this case four phases), Phase One would entail trucks, bulldozers, forklifts, and other heavy construction equipment for this major construction projects (HTTC, convoy road, Point Bravo SRCC, roads, etc.). This phase (as well as the next three phases) of construction would be temporary and isolated. These projects would be undertaken in restricted, unpopulated areas, far from any communities and would not impact the surrounding landscape.

Under the no-action alternative, the HTTC, associated facilities, and infrastructure would not be established; therefore, noise levels would remain unchanged and activities would continue at their current levels.

### 3.7.2 Proposed Action Two

***Existing Conditions***. Under both action alternatives the MOUT would be constructed on land underlying airspace unit Range 63. Baseline noise levels, as analyzed in the F-22 Force Development EIS (Air Force 1999a), are provided in Table 3.7-2.

**Table 3.7-2 Baseline Noise Levels ($L_{dnmr}$) for NTTR**

| *Airspace Unit* | *28,000 Sortie-Operations* | *42,000 Sortie-Operations* |
|---|---|---|
| Proposed Action Two | 53 | 55 |

Facility and infrastructure construction and academic activities in Alternatives 2A and 2B would take place at Indian Springs AFAF or across U.S. Highway 95 at ISAFAF-owned property and would not involve any airspace related activities.

***Environmental Consequences***. Under Proposed Action Two sortie-operations would not change in R63. Aircraft would enter and transit in the airspace unit similarly to current mission events. Therefore, noise levels would remain the same as those presented in the F-22 Force Development EIS (Air Force 1999a).

Short-term localized noise increases due to construction and upgrades, as well as infrastructure (parking lots) installment and realignment would occur. Construction would occur in stages over 5 years, the earlier stage entails trucks, forklifts, bulldozers, and other heavy construction equipment for the major construction projects (MOUT, academic, lodging, and dining facilities). This stage of construction would be temporary. Under Alternative 2A construction would occur in the base environs of ISAFAF and would be compatible with ongoing activities. However, under Alternative 2B, facilities would be constructed adjacent to the Indian Springs community. All construction would take place during daylight hours to minimize noise to any off-base receptors.

Under the no-action alternative, the MOUT and associated facilities and infrastructure would not be established, therefore, noise levels would remain unchanged and activities would continue at their current levels.

***Combined Environmental Consequences of Proposed Action One and Proposed Action Two.*** The combined environmental consequences of undertaking both Proposed Action One and Two would have negligible impact to noise since there would not be any significant impacts if either Proposed Action were

Action were undertaken.  Short-term construction noise would occur but would be dispersed over wide geographic areas so this would not create a combined impact to the environment.

# CHAPTER 4

# CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

# CHAPTER 4
# CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

## 4.1 CUMULATIVE EFFECTS

A cumulative effects analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Assessing cumulative effects involves defining the scope of the other actions and their interrelationship with the proposed actions if they overlap in space and time. Cumulative effects are most likely to arise when a proposed action(s) is related to other actions that could occur in the same location or at a similar time. Actions geographically overlapping or close to the proposed actions would likely have more potential for a relationship than those farther away. Similarly, actions coinciding in time with the proposed actions would have a higher potential for cumulative effects.

To identify cumulative effects, the analysis needs to address three questions:

1. Could affected resource areas of the proposed actions interact with the affected resource areas of past, present, or reasonably foreseeable actions?
2. If one or more of the affected resource areas of the proposed actions and another action could interact, would the proposed actions affect or be affected by impacts of the other action?
3. If such a relationship exists, are there any potentially significant impacts not identified when the proposed actions are considered alone?

## 4.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time in which the effects could occur. This cumulative effects analysis includes the boundaries of the affected areas for the proposed actions. Actions not occurring within or near these areas are not considered in the analysis. The time frame for cumulative effects starts in 2002 when construction activities for Proposed Action Two would likely start. Construction for Proposed Action One would begin in 2004. Under both proposed actions, phased construction would extend through 2006 to 2007.

For purposes of this analysis, public documents prepared by federal, state, and local government agencies were the primary sources of information for identifying reasonably foreseeable actions.
In Chapter 3, each resource was not only assessed for the specific environmental consequences of individual elements (construction, operations, and maintenance activities) of Proposed Action One and Proposed Action Two; it also assessed the combined effects of both proposed actions if they occurred at the same time. Since this aspect of interrelationship of combined effects was presented in Chapter 3, it will not be discussed further in this section.

**Past and Present Actions**

Known past and present actions that might result in cumulative effects are all Air Force activities at NTTR. These past and present actions involve use of airspace and would not change from those described in the Nellis Renewal LEIS (Air Force 1999b).

**Future Proposed Actions**

Actions potentially relating to the cumulative effects for the proposed Nevada Training Initiative could include those of the Department of Defense, Department of Energy, Department of the Interior, and local counties. These actions have been analyzed previously in the Nellis Renewal LEIS (Air Force 1999b). The activities, when evaluated with either or both proposed actions, would not generate any additive cumulative effects to the region since these actions would take place on withdrawn land, be located within impact areas designated for NTTR, isolated from urban centers, and are consistent with current NTTR activities.

## 4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires that environmental analysis include identification of "…any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects this use could have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural resource).

For the Nevada Training Initiative proposal, most resource commitments are neither irreversible nor irretrievable. Most impacts are short-term and temporary, or longer lasting, but negligible. Those limited resources that may involve a possible irreversible or irretrievable commitment are discussed below.

Personal and contract vehicles used by personnel at the Point Bravo SRCC as well as those maintaining the HTTC, associated facilities, as well as scoring and threat emitter sites would consume fuel, oil, and lubricants. The amount of these materials used would not likely exceed that currently used by these individuals maintaining similar equipment for NTTR facilities. As such, the two proposed actions would not increase consumption of these resources. In addition, quantities of materials used in construction would be committed under the proposed actions. The increase in the use of these materials would be minimal.

Construction would occur on previously disturbed areas and on locations with native habitat. However, the native habitat lost in relation to the near 2.9-million acres of land on NTTR would be negligible. Similarly, construction would avoid significant cultural resources. While construction of new facilities would incur soil disturbance and loss, use of Best Management Practices (e.g., watering roads while undertaking construction, building culverts to channel stormwater) would localize and minimize soil loss. Use of ordnance (inert and strafing) would cause negligible ground disturbance, soil exposure, and soil erosion. Areas affected by this ordnance use would remain in the impact zones, so little new disturbance would be likely.

# CHAPTER 5

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Hughes, Frank. Captain RMO/RMF. Nellis AFB, NV. August to October 2001.

Myhrer, Keith. HQ 99$^{th}$ Air Base Wing/EM. Nellis AFB, NV. 2001 and 2002.

Nichols, Dale G. MSgt. HQ ACC/SFOT. Langley AFB, VA. 2001 and 2002.

Thole, Joanie. Major HQ AWFC/RMO, Plans and Programs. Nellis AFB, NV. July to September 2001.

# CHAPTER 7

# LIST OF PREPARERS AND CONTRIBUTORS

# CHAPTER 7
# LIST OF PREPARERS AND CONTRIBUTORS

Marianne Aydil, Air Quality
B.S., Chemical Engineering, Tulane University, 1987
Ph.D., Chemical Engineering, University of Houston, 1992
Years of Experience: 11

Raul C. Bennett, ACC/DOR Project Manager
B.A., Psychology, Kent State University, 1974
M.A., Personnel Management, Central Michigan University, 1982
Years of Experience: 10

Kevan P. Gale, GIS Project Manager
B.S., Environmental Science, Spring Field College, 1997
M.S., Forestry/GIS, University of Massachusetts, 1999
Years of Experience: 5

Christina Gross, Production Coordinator
A.A.S., Administrative Office Technology, Boise State University, 1999
Years of Experience: 3

Bret Guisto, Cultural Resources
B.A., Archaeology, Simon Fraser University, 1995
Years of Experience: 11

Charee D. Hoffman, Environmental Analyst
B.S., Biology, Christopher Newport University VA, 1999
Years of Experience: 3

Joanne Lortie, Socioeconomics/Public Utilities
M.A., Economics, Tufts University, 1990
B.A., Economics and Spanish, Tufts University, 1984
Graduate Coursework, Environmental Policy, Tufts University, 1990-1993
Years of Experience: 14

Edie Mertz, Graphics
A.A. General Education, Cerro Coso College, 1994
Years of Experience: 2

Monica Neiwert, Biology
B.S., Botany, University of Idaho, 1990
Years of Experience: 6

Sheryl Parker, ACC/CEVP Project Manager
B.S., Agronomy, Virginia Polytechnic Institute and State University, 1980
Years of Experience: 24

Kevin J. Peter, Project Manager
B.A., Anthropology, Pomona College, 1975
M.A., Anthropology, Washington State University, 1986
Years of Experience: 24

Kathy L. Rose, Deputy Project Manager
B.A., Political Science/German, University of Massachusetts/Amherst, 1980
M.A., International Relations, George Washington University, 1983
M.S., Forest Resource Management, University of Idaho, 1996
Years of Experience: 7

Teresa Rudolph, Cultural Resources
B.A., Anthropology, Florida State University, 1975
M.A., Anthropology, Southern Illinois University, 1981
Years of Experience: 23

Eric J. Tarala, GIS Specialist
B.S., Geographic Science, James Madison University, 2000
Years of Experience: 1

Kurt Wald, Soils and Water Resources
B.S., Hydrogeology, Boise State University, 2000
Years of Experience: 4

# APPENDIX A

# STATE AND FEDERAL LISTED SPECIES POTENTIALLY FOUND WITHIN THE VICINITY OF THE PROPOSED ACTIONS AT NEVADA TEST AND TRAINING RANGE (NTTR)

# APPENDIX A
# STATE AND FEDERAL LISTED SPECIES POTENTIALLY FOUND WITHIN THE VICINITY OF THE PROPOSED ACTIONS AT NEVADA TEST AND TRAINING RANGE (NTTR)

The following provides a list of all state and federally listed plant species potentially found within the NTTR. These lists include the common and scientific names, state and federal rankings, and brief description of potential habitat where the species in commonly found.

**Table A-1 Special Status Plant Species Known or Likely to Occur on NTTR with the Vicinity of the Proposed Actions (page 1 of 3)**

| ***Scientific Name*** ***Common Name*** | ***Regulatory Status***[1] | ***Heritage Rank***[2] | ***Description, Flowering, Period*** | ***Distribution and Habitat (reference)*** |
|---|---|---|---|---|
| *Arctomecon californica* Las Vegas bearpoppy | SOC, CE | | Cespitose perennial herb, with 6-20 yellow flowers on each stalk; flowers April-May | On barren slopes, flats, and hummocks, often on gypsum soils, in creosote bush scrub, 1,310-2,760 feet. |
| *Artomecon merriami* Merriam's bearpoppy | SOC, BLM | G3S2 | Clumped perennial herb, with white flowers borne singly on stalks; flowers April-June | Shallow gravelly soils, limestone outcrops, flats and dry lake beds, in various Mojave Desert scrub communities, 2,000-6,300 feet. |
| *Asclepias eastwoodiana* Eastwood milkweed | SOC, BLM | G2S2 | Low, few-stemmed perennial herb from woody caudex; flowers May-June | Occurs in low alkaline clay hills or shallow, gravelly drainages, in shadscale scrub, 5,300-6,900 feet. |
| *Astragalus amphioxus* var. *musimonum* Sheep Range milkvetch | SOC, BLM | G5T2S2 | Low tufted perennial herb; flowers April-June | On dry limestone bajadas, gentle slopes, disturbed areas, in mixed Mojave Desert scrub and pinyon-juniper woodland, 4,400-6,400 feet. |
| *Astragalus beatleyae* Beatly milkvetch | SOC, CE | G2S2 | Dwarf, cespitose perennial herb; flowers in May | On shallow, gravelly rhyolitic tuff soil, in barren areas, mixed scrub, and pinyon-juniper woodland, 5,600-6,800 feet. |
| *Astragalus funereus* Black wollypod | SOC, BLM | G2S2 | Mat-forming perennial herb; flowers March-May | On steep, gravelly slopes of volcanic tuff, occasionally on limestone screes, in barren areas and shadscale scrub, 3,200-7,680 feet. |
| *Astragalus mohavensis* var. *hemigyrus* Half-ring pod milkvetch | SOC, CE | G3T2S2 | Bushy perennial herb; flowers April-June | On limestone ledges and gravelly hillsides, with creosote, juniper, 3,400-6,070 feet. |

**Table A-1 Special Status Plant Species Known or Likely to Occur on NTTR within the Vicinity of the Proposed Actions (page 2 of 3)**

| *Scientific Name*<br>*Common Name* | *Regulatory Status*[1] | *Heritage Rank*[2] | *Description, Flowering, Period* | *Distribution and Habitat (reference)* |
|---|---|---|---|---|
| *Astragalus oophorus* var. *clokeyanus*<br>Clokey eggvetch | SOC | | Low, slender perennial herb; flowers June-July | On NAFR in washes bordering pinyon-juniper; elsewhere on ridges and slopes in gravelly limestone soil, in sagebrush scrub, pinyon-juniper woodland, and montane forest, 6,800-9,100 feet. |
| *Camissonia megalantha*<br>Cane Spring evening primrose | SOC | G1S2 | Annual herb; flowers in May or June-October | In washes on volcanic soils and on a talus seepage slope at Cane Spring, in shadscale scrub. |
| *Castilleja martinii* var. *clokeyi*<br>Clokey paintbrush | SOC | G3T2S2 | Perennial herb; flowers June-July | On mountains in sagebrush scrub, pinyon-juniper woodland, ponderosa pine-white fir forest, 6,200-9,000 feet. |
| *Cymopterus ripleyi* var. *saniculoides*<br>Sanicle biscuitroot | SOC, BLM | G1S1 | Perennial herb; flowers in April-June | On sand dunes, sandy soil, volcanic tuff, in shadscale scrub, 3,900-6,800 feet. |
| *Erigeron ovinus*<br>Sheep fleabane | SOC, BLM | G1S1 | Perennial herb from taproot; flowers in June | On limestone outcrops in pinyon-juniper woodland, 6,200-8,400 feet. |
| *Erigonium corymbostem* var. *glutinosum*<br>Golden buckwheat | SOC | G5T3<br>S1S2 | Large yellow-flowered shrub; flowers July-October | On fire or sandy soils in mixed desert shrub communities. |
| *Frasera pahutensis*<br>Pahute green gentian | SOC, BLM | G2S2 | Low, spreading perennial herb arising from woody rootstocks; flowers May-July | On gravelly slopes and valley bottoms, in pinyon-juniper woodland, 7,200-7,900 feet. |
| *Galium hilendiae ssp. kingstonense*<br>Kingston bedstraw | SOC, BLM | G4T2S2 | Dioecious, mat-forming, weak-stemmed perennial subshrub; flowers in June | On loose, rocky soil in ravines and gullies, in sagebrush scrub, pinyon-juniper woodland, 5,500-6,500 feet. |
| *Penstemon pahutensis*<br>Pahute Mesa beardtongue | SOC, BLM | G2S2 | Perennial herb arising from root crown; flowers June-July | On loose soil, rock areas; in barren areas and pinyon-juniper woodland, 5,800-7,500 feet. |
| *Perityle megalocephala* var. *intricata*<br>Delicate Rock Daisy | SOC, BLM | G3S3 | Perennial shrub flowers April-September | Creosote bush shrub, crevices or rubble of carbonate outcrops, 2,600-6,000 feet. |
| *Phacelia beatleyae*<br>Beatley's phacelia | SOC, BLM | G2S2 | Diminutive annual herb; flowers April-May | On gravel or volcanic tuff, along washes and in canyons, also on slopes. In barren areas, creosote bush scrub, shadscale scrub, 2,500-5,800 feet. |

**Table A-1 Special Status Plant Species Known or Likely to Occur on NTTR within the Vicinity of the Proposed Actions (page 3 of 3)**

| ***Scientific Name*** ***Common Name*** | ***Regulatory Status***[1] | ***Heritage Rank***[2] | ***Description, Flowering, Period*** | ***Distribution and Habitat (reference)*** |
|---|---|---|---|---|
| *Phacelia parishii* Parish's phacelia | SOC, BLM | | Low-spreading annual herb; flowers in May | Playas, shadscale scrub, 3,000-3,200 feet. |

*Source:* Air Force 1999b

1. Status abbreviated as follows:
   Federal Status
   FC = Candidate for federal listing as threatened or endangered.
   SOC = Federal Species of Concern, indicating former candidate status and potential for reconsideration in the future.
   BLM = Listed on Nevada BLM Sensitive Species List (4/97).
   State Status
   CE = Listed as Critically Endangered by the Nevada Division of Forestry

2. TNC Rankings (TNC 1997) abbreviated as follows:
   G = Global rank indicator, based on worldwide distribution at the species level.
   T = Trinomial rank indicator, based on worldwide distribution at the infraspecific level.
   S = State rank indicator, based on distribution within Nevada at the lowest taxonomic level.

   1 = Critically imperiled due to extreme rarity, imminent threats, or biological factors.
   2 = Imperiled due to rarity or other demonstrable factors.
   3 = Rare and local throughout its range, or with very restricted range, or otherwise vulnerable to extinction.
   4 = Apparently secure, though frequently quite rare in parts of its range, especially at the periphery.
   5 = Demonstrably secure, though frequently quite rare in parts of its range, especially at the periphery.

| **Table A-2 Special Status Wildlife Species Known or Likely to Occur within the Vicinity of the Proposed Action on NTTR (page 1 of 2)** | | | |
|---|---|---|---|
| ***Species*** | ***Status*** | | ***Occurrence on Range, Overflight Areas*** |
| | ***Federal*** | ***State*** | |
| ***Threatened or Endangered Species*** | | | |
| Desert tortoise *(Gopherus agassizii)* | T | T | Present in low densities throughout Mojave Desert scrub habitat. |
| ***Special Status Species*** | | | |
| Pygmy rabbit *(Brachylagus idahoensis)* | SOC | | Found in sagebrush communities where stands are dense, alluvial habitat is preferred. Potentially occurs on NAFR. |
| Spotted bat *(Euderma maculatum)* | SOC | T | Found in various habitats from desert to mountain coniferous forest but always in association with nearby high cliff faces. Observed on the NTS and potentially occurs on NAFR. |
| Peregrine falcon *(Falco peregrinus)* | SOC | | Expected as a rare transient. No records of breeding on NAFR. |
| Western small-footed myotis *(Myotis ciliolabrum)* | SOC, BLM | | Occurs in a variety of habitats but most common in arid environments. Roosts primarily in caves, buildings, mines, or crevices. Observed on the NTS and potentially occurs on NAFR. |
| Long-eared myotis *(Myotis evotis)* | SOC, BLM | | Occurs primarily in forests by also less frequently in sage and chaparral habitats. Roosts in cracks in cliffs, hollow trees, caves, mines and buildings. Observed on the NTS and potentially occurs on NAFR. |
| Fringed myotis *(Myotis thysanodes)* | SOC, BLM | | Found in desert scrub, shrub-steppe, oak-pinyon and coniferous forest habitats. Roosts in caves, rock crevices and buildings. Observed on NAFR. |
| Long-legged myotis *(Myotis volans)* | SOC, BLM | | Typically associated with montane forests but also found in riparian and desert habitats. Roosts in rock crevices in cliffs, cracks in ground, behind loose bark on trees, and buildings. Observed on NAFR. |
| Townsend's big-eared bat *(Corynorhinus townsendii pallescens)* | SOC, BLM | | Roosts in caves, mines and buildings. |
| Least bittern *(Ixobrychus exilis hesperis)* | SOC | | Observed in wetlands of Pahranagat Valley. Expected in small ponds on NAFR infrequently in small numbers. |
| White-faced ibis *(Plegadis chihi)* | SOC | | Observed in wetlands of Pahranagat Valley. Expected in small ponds on NAFR infrequently in small numbers. |
| Ferruginous hawk *(Buteo regalis)* | SOC | | Spring and fall migrant and winter visitor in low numbers. No records of breeding on NAFR. |

**Table A-2 Special Status Wildlife Species Known or Likely to Occur Within the Vicinity of the Proposed Action on NTTR (page 2 of 2)**

| ***Species*** | ***Status*** | | ***Occurrence on Range, Overflight Areas*** |
|---|---|---|---|
| | ***Federal*** | ***State*** | |
| Black tern *(Childonias niger)* | SOC, BLM | | Observed at wetlands in Pahranagat Valley. Spring and fall migrant and summer visitor to the region and possibly the NAFR. |
| Burrowing owl *(Athene cunicularia)* | SOC | P | A spring and fall migrant and breeder on the NAFR. Recorded on NAFR in Great Basin desert scrub and expected in slightly disturbed areas. |
| Phainopepla *(Phainopepla nitens)* | BLM | P | A permanent resident of Mojave Desert scrub and desert spring habitats. Observed on NAFR. |
| Chuckwalla *(Sauromalus obesus)* | SOC, BLM | | Expected in rocky hillsides and rock outcrops within the Mojave Desert scrub community. |

*Notes:* E Endangered
T Threatened
SOC Federal Species of Concern
BLM Nevada BLM Sensitive Species List
CE Listed as Critically Endangered by Nevada Department of Wildlife
P Protected by the Nevada Division of Wildlife
*Source:* Air Force 1999b

# APPENDIX B

# AIR QUALITY ANALYSIS

# APPENDIX B
# AIR QUALITY ANALYSIS

**Air Quality Standards**

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. The Clean Air Act (CAA) and its subsequent amendments (CAAA) established the National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants: ozone ($O_3$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter less than 10 microns ($PM_{10}$), and lead (Pb). These standards (Table B-1) represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. The Nevada Department of Environmental Protection (NDEP), Bureau of Air Quality (BAQ) has adopted the NAAQS, with the following exceptions and additions: 1) state annual $SO_2$ standard is more stringent than the national standard; 2) a new 8-hour CO standard specific to elevations greater than 5,000 feet above mean seal level; and 3) new standards for visibility and 1-hour hydrogen sulfide standards. The state ambient air quality standards are also summarized in Table B-1.

**Table B-1 State and National Ambient Air Quality Standards**

| | *Nevada Standards*[A] | | *National Standards*[B] | |
|---|---|---|---|---|
| | AVERAGING TIME | CONCENTRATION CENTER | PRIMARY CENTER[C,D] | SECONDARY CENTER[C,E] |
| Ozone | 1 Hour | 235 µg/m3 (0.12 ppm) | 235 µg/m3 (0.12 ppm) | Same as Primary |
| Ozone-Lake Tahoe Basin, #90 | | 190 µg/m3 (0.10 ppm) | -- | |
| Carbon Monoxide less than 5,000 ft above MSL | 8 Hours | 10 mg/m3 (9.0 ppm) | 10 mg/m3 (9.0 ppm) | None |
| Carbon Monoxide at or greater 5,000 ft above MSL | | 6.67 mg/m3 (6.0 ppm) | | |
| Carbon Monoxide at any elevation | 1 Hour | 40 mg/m3 (35 ppm) | 40 mg/m3 (35 ppm) | |
| Nitrogen Dioxide | Annual Arithmetic Mean | 100 µg/m3 (0.05 ppm) | 100 µg/m3 (0.05 ppm) | Same as Primary |
| Sulfur Dioxide | Annual Arithmetic Mean | 80 µg/m3 (0.03 ppm) | 80 µg/m3 (0.03 ppm) | None |
| | 24 Hours | 365 µg/m3 (0.14 ppm) | 365 µg/m3 (0.14 ppm) | |
| | 3 Hours | 1,300 µg/m3 (0.5 ppm) | None | 1,300 µg/m3 (0.5 ppm) |
| Particulate Matter as $PM_{10}$ | Annual Arithmetic Mean | 50 µg/m3 | 50 µg/m3 | Same as Primary |
| | 24 Hours | 150 µg/m3 | 150 µg/m3 | |
| | 24 Hours | | 65 µg/m3 | |
| Lead (Pb) | Quarterly Arithmetic Mean | 1.5 µg/m3 | 1.5 µg/m3 | Same as Primary |
| Visibility | Observation | In sufficient amount to reduce the prevailing visibility to less than 30 miles when humidity is less than 70% | -- | -- |
| Hydrogen Sulfide | 1 Hour | 112 µg/m3 (0.08 ppm) | -- | -- |

Notes:(a) µ g/m " means micrograms per cubic meter. 3, (b) "ppm" means part per million by volume.

Note A: These standards must not be exceeded in areas where the general public has access.
Note B: These standards, other than for ozone and those based on annual averages, must not be exceeded more than once per year. The ozone standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one.
Note C: Concentration is expressed first in units in which it was adopted and is based upon a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality must be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of Hg (1,013.2 millibars); ppm in this table refers to ppm by volume, or micromoles of regulated air pollutant per mole of gas.
Note D: National primary standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.
Note E: National secondary standards are the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a regulated air pollutant.

## Emission Estimation Approaches

Emission estimation approaches were based on methodologies developed by the California Air Resources Board in the determination of impacts for land development projects and employed in the URBEMIS model (San Joaquin Valley Unified APCD 2000). These methodologies were chosen for their ability to predict the amount of construction activity on a per acre or per foot basis for land development. California guidance (which is based on USEPA published emission factors) was used because Nevada does not have similar published methodologies or guidelines. Default assumptions were modified to include updated emission factors or construction practices particular to the proposed actions.

***Grading Equipment Exhaust.*** Site grading emissions comprise two components: grading equipment exhaust and grading-related fugitive $PM_{10}$ dust. Each component is described below. The procedure used to estimate grading equipment exhaust emissions is based on emission factors developed by U.S. Environmental Protection Agency (EPA 1985). The mobile construction equipment equations are based on the following equation:

*Emissions (pounds per day) = (pounds of pollutant emitted per hour [from Table B-2]) x ( hours per day for each equipment type operated)*

Table B-2 summarizes the mobile construction equipment emission factors used for the emission calculations. For example, if construction involves use of a wheeled loader for 8 hours per day, $PM_{10}$ emissions would total 1.36 pounds $PM_{10}$ per day or 0.17 pounds of $PM_{10}$ per hour x 8 hours per day.

**Table B-2 Mobile Construction Equipment Emission Factors (per hour)**

| | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
|---|---|---|---|---|---|
| Wheeled Tractor | 3.58 | 0.18 | 1.27 | 0.09 | 0.14 |
| Wheeled Loader | 0.572 | 0.23 | 1.9 | 0.182 | 0.17 |
| Motor Grader | 0.151 | 0.039 | 0.713 | 0.086 | 0.061 |

As a default, it is assumed that one tracked loader, one wheeled loader, and one motor grader (all diesel-powered) are needed for each 10 acres of land disturbed. It is also assumed that only 25 percent of total land acreage to be disturbed would actually be disturbed on the worst-case day.

***Fugitive Dust.*** The equation used to estimate fugitive dust $PM_{10}$ emissions, shown below, is based on the emission factor prepared by the California Air Resources Board for construction activities. This emission factor has also been used by Nevada to estimate fugitive dust emissions for $PM_{10}$ inventories (Clark County 2000, 2001).

*$PM_{10}$ (pounds per day) = (220 pounds of $PM_{10}$ / acre-month) x (month / 22 days) x (acres graded per day)*

The $PM_{10}$ emission factor of 220 pounds per acre-month is based on a report prepared for the SCAQMD (Midwest Research Institute 1995). It is assumed that the equipment is diesel-powered and used 8 hours per day. The acres-graded-per-day is based on the same acreage estimates generated for estimating grading equipment exhaust. Annual emissions are estimated using the same number of days of construction activity that was used for estimating grading equipment exhaust.

***Mobile Equipment.*** The procedure used to estimate mobile equipment emissions is similar to that used for grading equipment exhaust emissions. The mobile construction equipment equations are based on the following equation.

*Emissions (pounds/day) = (pounds of pollutant emitted per hour) x (hours per day for each equipment type operated)*

Table B-3 summarizes the mobile construction equipment emission factors used for emission calculations. These are based on USEPA emission factors (EPA 1985, 1991), which were compiled by SCAQMD (SCAQMD 1993).

**Table B-3 Mobile Construction Equipment Emission Factors**

| | *CO* | *VOCs* | *$NO_x$* | *$SO_x$* | *$PM_{10}$* |
|---|---|---|---|---|---|
| Forklift (175 Hp) | 0.52 | 0.17 | 1.54 | 0 | 0.093 |
| Off-Highway Truck | 1.8 | 0.19 | 4.17 | 0.45 | 0.26 |
| Crane | 0.8 | 0.25 | 1.92 | 0.17 | 0.13 |
| Roller | 0.3 | 0.065 | 0.87 | 0.067 | 0.05 |

As with the site grading equipment emissions, the square footage of building construction is used to estimate the default amount of equipment used. As a default, URBEMIS7G assumes that two pieces of mobile equipment (one forklift and one dump truck) are used 8 hours per day for construction activity of 10,000 feet (San Joaquin Valley Unified APCD 2000). Due to the modular nature of construction and the fact that the majority of buildings will not require interior construction (plumbing, electric, drywall, etc.), this assumption has been modified to two pieces of mobile equipment (one forklift and one dumptruck) for each construction activity of 20,000 square feet. The site-specific nature of the construction was also accounted for by including additional types of equipment such as cranes (needed to lift the components of the modular buildings) and rollers (for preparing surfaces of staging areas, mock runway, etc.) to the mobile equipment mix.

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## Assumptions for Acres Disturbed

| Alternative 1A/1B<br>Detailed Construction Information | | | | |
|---|---|---|---|---|
| | | | ***Number*** | ***Feet²*** |
| ***Phase I – FY04*** | New Point Bravo Facility | | 1 | 7,500 |
| | 91 Buildings/Facilities Constructed | | | |
| | 1 high | (>= 50 feet, 13,400 SF) | 1 | 13,400 |
| | 10 medium | (~20 feet, ~ 2,000 SF) | 10 | 2,000 |
| | 80 small | (~10 feet, ~1,000 SF) | 80 | 1,000 |
| | | | **Total Square Footage** | **120,900** |
| | | | | |
| ***Phase II – FY05*** | 129 Buildings/Facilities Constructed | | | |
| | 4 high | (>= 50 feet, 13,400 SF) | 4 | 13,400 |
| | 25 medium | (~20 feet, ~ 2,000 SF) | 25 | 2,000 |
| | 100 small | (~10 feet, ~1,000 SF) | 100 | 1,000 |
| | | | **Total Square Footage** | **203,600** |
| | | | | |
| ***Phase III – FY06*** | 124 Buildings/Facilities Constructed | | | |
| | 4 med/high | (>= 35 feet, 8,000 SF) | 4 | 8000 |
| | 8 moderate | (>= 25 feet, 3,500 SF) | 8 | 3500 |
| | 28 medium | (~20 feet, ~ 2,000 SF) | 28 | 2000 |
| | 56 small | (~10 feet, ~1,000 SF) | 56 | 1000 |
| | | | **Total Square Footage** | **172,000** |
| | | | | |
| ***Phase IV – FY07*** | 124 Buildings/Facilities Constructed | | | |
| | 4 med/high | (>= 35 feet, 8,000 SF) | 4 | 8,000 |
| | 20 moderate | (>= 25 feet, 3,500 SF) | 20 | 3,500 |
| | 100 small | (~10 feet, ~1,000 SF) | 100 | 1,000 |
| | | | **Total Square Footage** | **202,000** |
| | | | | |
| **Alternative 2A/2B<br>Detailed Construction Information** | | | | |
| | ***Facility*** | | ***Number*** | ***Feet²*** |
| ***FY02*** | Logistics Storage Warehouse | | | 6,000 |
| ***FY03*** | Munitions Storage Igloo | | | 1,000 |
| ***FY04*** | Expanded Classroom Facility | | | 5,000 |
| ***FY05*** | Kennel | | | 2,000 |
| | Academic Facility | | | 27,990 |
| | Dining/Lodging Facility | | | 75,028 |
| | Vehicle Parking Lot | | | 20,000 |
| | MOUT | | | |
| | 13 Buildings/Facilities Constructed for MOUT | | | |
| | 2 3-stories | (>= 35 feet, 8,000 SF) | 3 | 8,000 |
| | 2 2-stories | (>= 25 feet, 3,500 SF) | 2 | 3,500 |
| | 9 single story | (~10 feet, ~1,000 SF) | 9 | 1,000 |
| ***FY06*** | Paved Parking Lot | | | 20,000 |
| | | | **Total Square Footage** | **169,518** |

## Summary Tables for Proposed Actions One and Two

| Acreage | | | | |
|---|---|---|---|---|
| ***Year*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Alternative 2A*** | ***Alternative 2B*** |
| FY02 | -- | -- | 0.14 | 0.14 |
| FY03 | -- | -- | 0.02 | 0.02 |
| FY04 | 330 | 412 | 0.11 | 0.11 |
| FY05 | 175 | 173 | 97.5 | 97.5 |
| FY06 | 161 | 159 | 0.5 | 0.5 |
| FY07 | 203 | 201 | -- | -- |
| **Totals** | **869** | **945** | **98.27** | **98.27** |

| Building Square Footage | | | | |
|---|---|---|---|---|
| ***Year*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Alternative 2A*** | ***Alternative 2B*** |
| FY02 | -- | -- | 6,000 | 6,000 |
| FY03 | -- | -- | 1,000 | 1,000 |
| FY04 | 120,900 | 120,900 | 5,000 | 5,000 |
| FY05 | 203,600 | 203,600 | 137,518 | 137,518 |
| FY06 | 172,000 | 172,000 | 20,000 | 20,000 |
| FY07 | 202,000 | 202,000 | -- | -- |
| **Totals** | **698,500** | **698,500** | **169,518** | **169,518** |

| | Alternative 1A (tons/year) | | | | |
|---|---|---|---|---|---|
| ***Phase*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| I – FY04 | 49.9 | 6.3 | 69.4 | 5.9 | 56.9 |
| II – FY05 | 42.0 | 5.9 | 76.7 | 6.3 | 32.6 |
| III – FY06 | 37.3 | 5.2 | 65.3 | 5.4 | 29.7 |
| IV – FY07 | 46.3 | 6.4 | 80.6 | 6.6 | 37.4 |

| Alternative 1B (tons/year) | | | | | |
|---|---|---|---|---|---|
| ***Phase*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| I – FY04 | 58.5 | 7.2 | 77.1 | 6.6 | 70.5 |
| II – FY05 | 42.0 | 5.9 | 76.7 | 6.3 | 32.3 |
| III – FY06 | 37.3 | 5.2 | 65.3 | 5.4 | 29.4 |
| IV – FY07 | 46.3 | 6.4 | 80.6 | 6.6 | 37.1 |

| Alternative 2A/2B (tons/year) | | | | | |
|---|---|---|---|---|---|
| ***Year*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| FY02 | 0.7 | 0.1 | 1.0 | 0.1 | 0.1 |
| FY03 | 0.4 | 0.05 | 0.6 | 0.1 | 0.04 |
| FY04 | 0.7 | 0.1 | 1.0 | 0.1 | 0.1 |
| FY05 | 27.7 | 3.9 | 54.8 | 4.4 | 19.3 |
| FY06 | 0.5 | 0.1 | 0.7 | 0.1 | 0.1 |

## Detailed Summary Tables Per Alternative

| Alternative 1A | | | | | |
|---|---|---|---|---|---|
| | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| ***Phase I*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 52 |
| Site Grading Eqpt Exhaust | 34.4 | 3.6 | 31.1 | 2.9 | 3.0 |
| Construction Eqpt Exhaust | 15.5 | 2.7 | 38.3 | 3.0 | 2.4 |
| **Subtotal** | **49.9** | **6.3** | **69.4** | **5.9** | **56.9** |
| ***Phase II*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 27 |
| Site Grading Eqpt Exhaust | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| Construction Eqpt Exhaust | 24.8 | 4.1 | 61.1 | 4.8 | 3.8 |
| **Subtotal** | **42.0** | **5.9** | **76.7** | **6.3** | **32.6** |
| ***Phase III*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 25 |
| Site Grading Eqpt Exhaust | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| Construction Eqpt Exhaust | 20.1 | 3.4 | 49.7 | 3.9 | 3.1 |
| **Subtotal** | **37.3** | **5.2** | **65.3** | **5.4** | **29.7** |
| ***Phase IV*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 32 |
| Site Grading Eqpt Exhaust | 21.5 | 2.2 | 19.4 | 1.8 | 1.9 |
| Construction Eqpt Exhaust | 24.8 | 4.1 | 61.1 | 4.8 | 3.8 |
| **Subtotal** | **46.3** | **6.4** | **80.6** | **6.6** | **37.4** |
| **Maximum Year** | **49.9** | **6.4** | **80.6** | **6.6** | **56.9** |

| Alternative 1B | | | | | |
|---|---|---|---|---|---|
| | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| ***Phase I*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 64 |
| Site Grading Eqpt Exhaust | 43.0 | 4.5 | 38.8 | 3.6 | 3.7 |
| Construction Eqpt Exhaust | 15.5 | 2.7 | 38.3 | 3.0 | 2.4 |
| **Subtotal** | **58.5** | **7.2** | **77.1** | **6.6** | **70.5** |
| ***Phase II*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 27 |
| Site Grading Eqpt Exhaust | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| Construction Eqpt Exhaust | 24.8 | 4.1 | 61.1 | 4.8 | 3.8 |
| **Subtotal** | **42.0** | **5.9** | **76.7** | **6.3** | **32.3** |
| ***Phase III*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 25 |
| Site Grading Eqpt Exhaust | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| Construction Eqpt Exhaust | 20.1 | 3.4 | 49.7 | 3.9 | 3.1 |
| **Subtotal** | **37.3** | **5.2** | **65.3** | **5.4** | **29.4** |
| ***Phase IV*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 31 |
| Site Grading Eqpt Exhaust | 21.5 | 2.2 | 19.4 | 1.8 | 1.86 |
| Construction Eqpt Exhaust | 24.8 | 4.1 | 61.1 | 4.8 | 3.8 |
| **Subtotal** | **46.3** | **6.4** | **80.6** | **6.6** | **37.1** |
| **Maximum Year** | **58.5** | **7.2** | **80.6** | **6.6** | **70.5** |

| Alternatives 2A or 2B (tons/year) | | | | | |
|---|---|---|---|---|---|
| | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| ***FY02*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 0.004 |
| Site Grading Eqpt Exhaust | 0.38 | 0.04 | 0.34 | 0.03 | 0.03 |
| Construction Eqpt Exhaust | 0.28 | 0.04 | 0.69 | 0.05 | 0.04 |
| **Subtotal** | **0.7** | **0.1** | **1.0** | **0.1** | **0.1** |
| ***FY03*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | -- |
| Site Grading Eqpt Exhaust | 0.17 | 0.02 | 0.16 | 0.01 | 0.01 |
| Construction Eqpt Exhaust | 0.19 | 0.03 | 0.46 | 0.04 | 0.03 |
| **Subtotal** | **0.4** | **0.05** | **0.6** | **0.05** | **0.04** |
| ***FY04*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 0.003 |
| Site Grading Eqpt Exhaust | 0.38 | 0.04 | 0.34 | 0.03 | 0.03 |
| Construction Eqpt Exhaust | 0.28 | 0.04 | 0.69 | 0.05 | 0.04 |
| **Subtotal** | **0.7** | **0.1** | **1.0** | **0.1** | **0.1** |
| ***FY05*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 15.6 |
| Site Grading Eqpt Exhaust | 8.6 | 0.9 | 7.8 | 0.7 | 0.7 |
| Construction Eqpt Exhaust | 19.1 | 3.0 | 47.0 | 3.7 | 2.9 |
| **Subtotal** | **27.7** | **3.9** | **54.8** | **4.4** | **19.3** |
| ***FY06*** | | | | | |
| Fugitive Dust | -- | -- | -- | -- | 0.013 |
| Site Grading Eqpt Exhaust | 0.4 | 0.1 | 0.3 | 0.0 | 0.0 |
| Construction Eqpt Exhaust | 0.14 | 0.02 | 0.35 | 0.04 | 0.02 |
| **Subtotal** | **0.5** | **0.1** | **0.7** | **0.04** | **0.023** |
| **Maximum Year** | **27.7** | **3.9** | **54.8** | **4.4** | **19.3** |

## Fugitive Dust Emissions

| Uncontrolled Fugitive Dust Emissions (lbs/day) | | | | |
|---|---|---|---|---|
| ***Year*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Alternative 2A*** | ***Alternative 2B*** |
| FY02 | -- | -- | 0.7 | 0.7 |
| FY03 | -- | -- | 0.1 | 0.1 |
| FY04 | 825 | 1030 | 0.6 | 0.6 |
| FY05 | 437.5 | 432.5 | 250 | 250 |
| FY06 | 402.5 | 397.5 | 2.3 | 2.3 |
| FY07 | 507.5 | 502.5 | -- | -- |

Maximum acres graded per day = 0.25 * Total Site Acres

$PM_{10}$ (lbs/day) = (220 pounds PM10/acre-month) x ( month/ 22 days) x acres graded per day

| Uncontrolled Fugitive Dust Emissions (tons/year) | | | | |
|---|---|---|---|---|
| ***Year*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Alternative 2A*** | ***Alternative 2B*** |
| FY02 | -- | -- | 0.008 | 0.008 |
| FY03 | -- | -- | 0.001 | 0.001 |
| FY04 | 103.13 | 128.75 | 0.006 | 0.006 |
| FY05 | 54.69 | 54.06 | 31 | 31 |
| FY06 | 50.31 | 49.69 | 0.03 | 0.03 |
| FY07 | 63.44 | 62.81 | -- | -- |

$PM_{10}$ (tons/year) = PM10 (lbs/day) * (working days /year ) * (ton/2000 lbs)

** 250 construction days per year

| Controlled Fugitive Dust Emissions (tons/year) | | | | |
|---|---|---|---|---|
| ***Year*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Alternative 2A*** | ***Alternative 2B*** |
| FY02 | -- | -- | 0.004 | 0.004 |
| FY03 | -- | -- | 0.000 | 0.000 |
| FY04 | 52 | 64 | 0.003 | 0.003 |
| FY05 | 27 | 27 | 16 | 16 |
| FY06 | 25 | 25 | 0.01 | 0.01 |
| FY07 | 32 | 31 | -- | -- |

PMcontrolled = $PM_{10}$ uncontrolled * (1-%CE/100)

** 50% assumed control efficiency

## Grading Equipment Exhaust

| Land Disturbed Per Day (acres) | | | |
|---|---|---|---|
| ***Year*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Alternatives 2A/B*** |
| FY02 | -- | -- | 0.07 |
| FY03 | -- | -- | 0.01 |
| FY04 | 82.5 | 103 | 0.06 |
| FY05 | 43.75 | 43.25 | 25.01 |
| FY06 | 40.25 | 39.75 | 0.23 |
| FY07 | 50.75 | 50.25 | -- |

| Suites of Construction Equipment for Grading (1 wheeled tractor, 1 wheeled loader, 1 motor grader) | | | |
|---|---|---|---|
| | ***Acreage*** | | |
| ***Year*** | ***Alternative 1A*** | ***Alternative 1B*** | ***Alternatives 2A/2B*** |
| FY02 | -- | -- | 1 |
| FY03 | -- | -- | 1 |
| FY04 | 8 | 10 | 1 |
| FY05 | 4 | 4 | 2 |
| FY06 | 4 | 4 | 1 |
| FY07 | 5 | 5 | -- |

| Alternative 1A | | | | | |
|---|---|---|---|---|---|
| | ***Emissions (lbs/day)*** | | | | |
| ***Phase*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| I – FY04 | 275 | 29 | 249 | 23 | 24 |
| II – FY05 | 138 | 14 | 124 | 11 | 12 |
| III – FY06 | 138 | 14 | 124 | 11 | 12 |
| IV – FY07 | 172 | 18 | 155 | 14 | 15 |

| | ***Emissions (tons/year)*** | | | | |
|---|---|---|---|---|---|
| ***Phase*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| I – FY04 | 34.4 | 3.6 | 31.1 | 2.9 | 3.0 |
| II – FY05 | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| III – FY06 | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| IV – FY07 | 21.5 | 2.2 | 19.4 | 1.8 | 1.9 |

| Alternative 1B | | | | | |
|---|---|---|---|---|---|
| | ***Emissions (lbs/day)*** | | | | |
| ***Phase*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| I – FY04 | 344 | 36 | 311 | 29 | 30 |
| II – FY05 | 138 | 14 | 124 | 11 | 12 |
| III – FY06 | 138 | 14 | 124 | 11 | 12 |
| IV – FY07 | 172 | 18 | 155 | 14 | 15 |

| | ***Emissions (tons/year)*** | | | | |
|---|---|---|---|---|---|
| ***Phase*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| I – FY04 | 43.0 | 4.5 | 38.8 | 3.6 | 3.7 |
| II – FY05 | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| III – FY06 | 17.2 | 1.8 | 15.5 | 1.4 | 1.5 |
| IV – FY07 | 21.5 | 2.2 | 19.4 | 1.8 | 1.9 |

| Alternatives 2A/2B | | | | | |
|---|---|---|---|---|---|
| | ***Emissions (lbs/day)*** | | | | |
| ***Year*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| FY02 | 34 | 4 | 31 | 3 | 3 |
| FY03 | 34 | 4 | 31 | 3 | 3 |
| FY04 | 34 | 4 | 31 | 3 | 3 |
| FY05 | 69 | 7 | 62 | 6 | 6 |
| FY06 | 34 | 4 | 31 | 3 | 3 |

| Alternatives 2A/2B | | | | | |
|---|---|---|---|---|---|
| | ***Emissions (tons/year)*** | | | | |
| ***Year*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| FY02 | 0.38 | 0.04 | 0.34 | 0.03 | 0.03 |
| FY03 | 0.17 | 0.02 | 0.16 | 0.01 | 0.01 |
| FY04 | 0.38 | 0.04 | 0.34 | 0.03 | 0.03 |
| FY05 | 8.61 | 0.90 | 7.77 | 0.72 | 0.74 |
| FY06 | 0.38 | 0.04 | 0.34 | 0.03 | 0.03 |

| Mobile Construction Equipment Emission Factors (lbs/hour) | | | | | |
|---|---|---|---|---|---|
| | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| Wheeled Tractor | 3.58 | 0.18 | 1.27 | 0.09 | 0.14 |
| Wheeled Loader | 0.572 | 0.23 | 1.9 | 0.182 | 0.17 |
| Motor Grader | 0.151 | 0.039 | 0.713 | 0.086 | 0.061 |
| **Total** | **4.303** | **0.449** | **3.883** | **0.358** | **0.371** |

## Construction Equipment Exhaust

| Alternatives 1A/1B | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***Numbers of Pieces of Construction Equipment*** | | | | ***Days Required Per Year*** | | | |
| *Phase* | *Forklift* | *Truck* | *Crane* | *Roller* | *Forklift* | *Truck* | *Crane* | *Roller* |
| I – FY04 | 6 | 6 | 2 | 1 | 250 | 250 | 250 | 60 |
| II – FY05 | 10 | 10 | 2 | 1 | 250 | 250 | 250 | 60 |
| III – FY06 | 8 | 8 | 2 | 1 | 250 | 250 | 250 | 60 |
| IV – FY07 | 10 | 10 | 2 | 1 | 250 | 250 | 250 | 60 |

One forklift, one dumptruck required per 20,000 feet$^2$ of buildings, cranes for modular buildings

| Alternatives 2A/2B | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***Numbers of Pieces of Construction Equipment*** | | | | ***Days Required Per Year*** | | | |
| | *Forklift* | *Truck* | *Crane* | *Roller* | *Forklift* | *Truck* | *Crane* | *Roller* |
| FY02 | 1 | 1 | 0 | 0 | 30 | 30 | 0 | 0 |
| FY03 | 1 | 1 | 0 | 0 | 20 | 20 | 0 | 0 |
| FY04 | 1 | 1 | 0 | 0 | 30 | 30 | 0 | 0 |
| FY05 | 8 | 8 | 1 | 1 | 250 | 250 | 150 | 60 |
| FY06 | 0 | 1 | 0 | 1 | 0 | 15 | 0 | 30 |

One forklift, one dumptruck required per 20,000 feet$^2$ of buildings, cranes for modular buildings, roller for compaction of mock half-runway

| Alternative 1A/B<br>Annual Building Construction Exhaust Emissions(tons per year) | | | | | |
|---|---|---|---|---|---|
| ***Phase*** | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| I – FY04 | 15.5 | 2.7 | 38.3 | 3.0 | 2.4 |
| II – FY05 | 24.8 | 4.1 | 61.1 | 4.8 | 3.8 |
| III – FY06 | 20.1 | 3.4 | 49.7 | 3.9 | 3.1 |
| IV – FY07 | 24.8 | 4.1 | 61.1 | 4.8 | 3.8 |

| Alternatives 2A/B<br>Annual Building Construction Exhaust Emissions (tons per year) | | | | | |
|---|---|---|---|---|---|
| | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| FY02 | 0.3 | 0.0 | 0.7 | 0.1 | 0.0 |
| FY03 | 0.2 | 0.0 | 0.5 | 0.0 | 0.0 |
| FY04 | 0.3 | 0.0 | 0.7 | 0.1 | 0.0 |
| FY05 | 19.1 | 3.0 | 47.0 | 3.7 | 2.9 |
| FY06 | 0.1 | 0.0 | 0.4 | 0.0 | 0.0 |

| Mobile Construction Equipment Factors (lbs/hour) | | | | | |
|---|---|---|---|---|---|
| | ***CO*** | ***VOCs*** | ***$NO_x$*** | ***$SO_x$*** | ***$PM_{10}$*** |
| Forklift (175 Hp) | 0.52 | 0.17 | 1.54 | 0 | 0.093 |
| Off-Highway Truck | 1.8 | 0.19 | 4.17 | 0.45 | 0.26 |
| Crane | 0.8 | 0.25 | 1.92 | 0.17 | 0.13 |
| Roller | 0.3 | 0.065 | 0.87 | 0.067 | 0.05 |

# APPENDIX C

# AIRCRAFT NOISE ANALYSIS

# APPENDIX C
# AIRCRAFT NOISE ANALYSIS

Noise is generally described as unwanted sound. Unwanted sound can be based on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (community annoyance). Noise analysis thus requires a combination of physical measurement of sound, physical and physiological effects, plus psycho- and socioacoustic effects.

Section 1 of this Appendix describes how sound is measured, and summarizes noise impact in terms of community acceptability and land use compatibility. Section 2 gives detailed descriptions of the effects of noise that lead to the impact guidelines presented in Section 1. Section 3 provides a description of the specific methods used to predict aircraft noise.

## 1.0 NOISE DESCRIPTORS AND IMPACT

Aircraft operating in the MOAs and warning areas generate two types of sound. One is “subsonic” noise, which is continuous sound generated by the aircraft’s engines and also by air flowing over the aircraft itself. The other is sonic booms (only in MOAs and warning areas authorized for supersonic), which are transient impulsive sounds generated during supersonic flight. These are quantified in different ways.

Section 1.1 describes the quantities that are used to describe sound. Section 1.2 describes the specific noise metrics used for noise impact analysis. Section 1.3 describes how environmental impact and land use compatibility are judged in terms of these quantities.

## 1.1 QUANTIFYING SOUND

Measurement and perception of sound involves two basic physical characteristics: amplitude and frequency. Amplitude is a measure of the strength of the sound and is directly measured in terms of the pressure of a sound wave. Because sound pressure varies in time, various types of pressure averages are usually used. Frequency, commonly perceived as pitch, is the number of times per second the sound causes air molecules to oscillate. Frequency is measured in units of cycles per second, or Hertz (Hz).

**Amplitude.** The loudest sounds the human ear can comfortably hear have acoustic energy one trillion times the acoustic energy of sounds the ear can barely detect. Because of this vast range, attempts to represent sound amplitude by pressure are generally unwieldy. Sound is therefore usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as a sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Because of the logarithmic nature of the decibel scale, sounds levels do not add and subtract directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound’s intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB.

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB.

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as "decibel addition" or "energy addition." The latter term arises from the fact that combination of decibel values consists of first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

The difference in dB between two sounds represents the ratio of the amplitudes of those two sounds. Because human senses tend to be proportional (i.e., detect whether one sound is twice as big as another) rather than absolute (i.e., detect whether one sound is a given number of pressure units bigger than another), the decibel scale correlates well with human response.

Under laboratory conditions, differences in sound level of 1 dB can be detected by the human ear. In the community, the smallest change in average noise level which can be detected is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound intensity but only a 50 percent decrease in perceived loudness because of the nonlinear response of the human ear (similar to most human senses).

**Frequency.** The normal human ear can hear frequencies from about 20 Hz to about 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz range. When measuring community response to noise, it is common to adjust the frequency content of the measured sound to correspond to the frequency sensitivity of the human ear. This adjustment is called A-weighting (ANSI 1988). Sound levels that have been so adjusted are referred to as A-weighted sound levels. The amplitude of A-weighted sound levels is measured in dB. It is common for some noise analysts to denote the unit of A-weighted sounds by dBA or dB(A). As long as the use of A-weighting is understood, there is no difference between dB, dBA or dB(A). It is only important that the use of A-weighting be made clear. In this study, sound levels are reported in dB and are A-weighted unless otherwise specified.

A-weighting is appropriate for continuous sounds, which are perceived by the ear. Impulsive sounds, such as sonic booms, are perceived by more than just the ear. When experienced indoors, there can be secondary noise from rattling of the building. Vibrations may also be felt. C-weighting (ANSI 1988) is applied to such sounds. This is a frequency weighting that is flat over the range of human hearing (about 20 Hz to 20,000 Hz) and rolls off above and below that range. In this study, C-weighted sound levels are used for the assessment of sonic booms and other impulsive sounds. As with A-weighting, the unit is dB, but dBC or dB(C) are sometimes used. In this study, sound levels are reported in dB, and C-weighting is specified as necessary.

**Time Averaging.** Sound pressure of a continuous sound varies greatly with time, so it is customary to deal with sound levels that represent averages over time. Levels presented as instantaneous (i.e., as might be read from the dial of a sound level meter), are based on averages of sound energy over either 1/8 second (fast) or one second (slow). The formal definitions of fast and slow levels are somewhat complex, with details that are important to the makers and users of instrumentation. They may, however, be thought of as levels corresponding to the root-mean-square sound pressure measured over the 1/8-second or 1-second periods.

The most common uses of the fast or slow sound level in environmental analysis is in the discussion of the maximum sound level that occurs from the action, and in discussions of typical sound levels. Some sources (air conditioner, vacuum cleaner) are continuous sounds whose levels are constant for some time. Some sources (automobile, heavy truck) are the maximum sound during a vehicle passby. Some sources (urban daytime, urban nighttime) are averages over some extended period. A variety of noise metrics have been developed to describe noise over different time periods. These are described in Section 1.2.

## 1.2 NOISE METRICS

### 1.2.1 Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, $L_{max}$ or $L_{Amax}$. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

### 1.2.2 Peak Sound Level

For impulsive sounds, the true instantaneous sound pressure is of interest. For sonic booms, this is the peak pressure of the shock wave, as described in Section 3.2 of this Appendix. This pressure is usually presented in physical units of pounds per square foot. Sometimes it is represented on the decibel scale, with symbol $L_{pk}$. Peak sound levels do not use either A or C weighting.

### 1.2.3 Sound Exposure Level

Individual time-varying noise events have two main characteristics—a sound level which changes throughout the event and a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The Sound Exposure Level (abbreviated SEL or $L_{AE}$ for A-weighted sounds) combines both of these characteristics into a single metric.

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. Mathematically, the mean square sound pressure is computed over the duration of the event, then multiplied by the duration in seconds, and the resultant product is turned into a sound level. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that Sound Exposure Level measures this impact much more reliably than just the maximum sound level.

Because the sound exposure level and the maximum sound level are both used to describe single events, there is sometimes confusion between the two, so the specific metric used should be clearly stated.

Sound Exposure Level can be computed for C-weighted levels (appropriate for impulsive sounds), and the results denoted CSEL or $L_{CE}$. SEL for A-weighted sound is sometimes denoted ASEL. Within this study, SEL is used for A-weighted sounds and CSEL for C-weighted.

### 1.2.4 Equivalent Sound Level

For longer periods of time, total sound is represented by the equivalent continuous sound pressure level ($L_{eq}$). $L_{eq}$ is the average sound level over some time period (often an hour or a day, but any explicit time span can be specified), with the averaging being done on the same energy basis as used for SEL. SEL and $L_{eq}$ are closely related, differing by (a) whether they are applied over a specific time period or over an event, and (b) whether the duration of the event is included or divided out.

Just as SEL has proven to be a good measure of the noise impact of a single event, $L_{eq}$ has been established to be a good measure of the impact of a series of events during a given time period. Also, while $L_{eq}$ is defined as an average, it is effectively a sum over that time period and is thus a measure of the cumulative impact of noise.

### 1.2.5 Day-Night Average Sound Level

Noise tends to be more intrusive at night than during the day. This effect is accounted for by applying a 10-dB penalty to events that occur after 10 PM and before 7 AM. If $L_{eq}$ is computed over a 24-hour period with this nighttime penalty applied, the result is the day-night average sound level (DNL or $L_{dn}$). DNL is the community noise metric recommended by the U.S. Environmental Protection Agency (USEPA 1972) and has been adopted by most federal agencies (FICON 1992). It has been well established that DNL correlates well with community response to noise (Schultz 1978; Finegold *et al.* 1994). This correlation is presented in Section 1.3.

While DNL carries the nomenclature "average," it incorporates all of the noise at a given location. For this reason, DNL is often referred to as a "cumulative" metric. It accounts for the total, or cumulative, noise impact.

It was noted earlier that, for impulsive sounds, C-weighting is more appropriate than A-weighting. The day-night average sound level can be computed for C-weighted noise, and is denoted CDNL or $L_{Cdn}$. This procedure has been standardized, and impact interpretive criteria similar to those for DNL have been developed (CHABA 1981).

### 1.2.6 Onset-Adjusted Monthly Day-Night Average Sound Level

Aircraft operations in military airspace such as MOAs and warning areas generate a noise environment somewhat different from other community noise environments. Overflight are sporadic, occurring at random times and varying from day to day and week to week. This situation differs from most community noise environments, in which noise tends to be continuous or patterned. Individual military overflight events also differ from typical community noise events: noise from a low-altitude, high-airspeed flyover can have a rather sudden onset.

To represent these differences, the conventional Day-Night Average Sound Level metric is adjusted to account for the "surprise" effect of the sudden onset of aircraft noise events on humans (Plotkin *et al*. 1987; Stusnick *et al*. 1992; Stusnick *et al*. 1993). For aircraft exhibiting a rate of increase in sound level (called onset rate) of from 15 to 150 dB per second, an adjustment or penalty ranging from 0to 11 dB is added to the normal Sound Exposure Level. Onset rates above 150 dB per second require a 11 dB penalty, while onset rates below 15 dB per second require no adjustment. The Day-Night Average Sound Level is then determined in the same manner as for conventional aircraft noise events and is designated as Onset-Rate Adjusted Day-Night Average Sound Level (abbreviated $L_{dnmr}$). Because of the irregular occurrences of aircraft operations, the number of average daily operations is determined by using the calendar month with the highest number of operations. The monthly average is denoted $L_{dnmr}$.

## 1.3 NOISE IMPACT

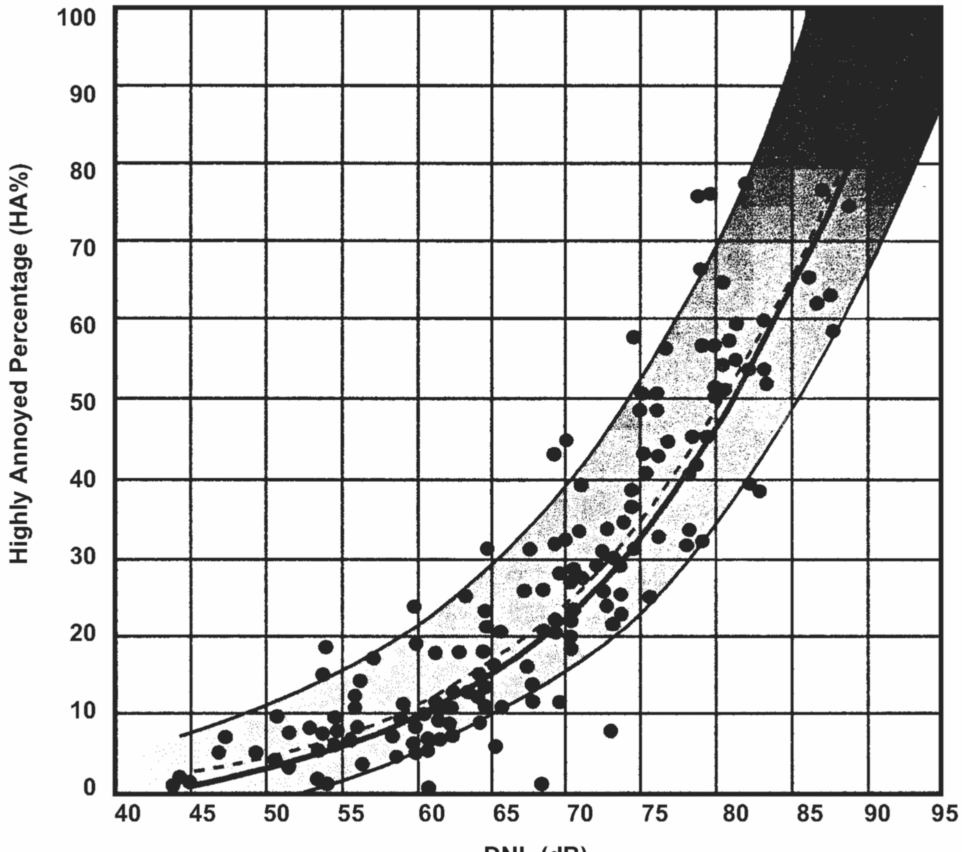
### 1.3.1 Community Reaction

Studies of community annoyance to numerous types of environmental noise show that DNL correlates well with impact. Schultz (1978) showed a consistent relationship between DNL and annoyance. Figure C-1 shows Shultz's original curve fit. This result shows that there is a remarkable consistency in results of attitudinal surveys which relate the percentages of groups of people who express various degrees of annoyance when exposed to different Day-Night Average Sound Levels.

A more recent study has reaffirmed this relationship (Fidell *et al*. 1991). Figure C-2 (FICON 1992) shows an updated form of the curve fit (Finegold *et al*. 1994) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using Day-Night Average Sound Level.

As noted earlier for Sound Exposure Level, Day-Night Average Sound Level does not represent the sound level heard at any particular time, but rather represents the total sound exposure. It accounts for the sound level of individual noise events, the duration of those events, and the number of events. Its use is endorsed by the scientific community (ANSI 1980; ANSI 1988; USEPA 1972; FICUN 1980; FICON 1992).

While DNL is the best metric for quantitatively assessing cumulative noise impact, it does not lend itself to intuitive interpretation by non-experts. Accordingly, it is common for environmental noise analyses to include other metrics for illustrative purposes. A general indication of the noise environment can be presented by noting the maximum sound levels which can occur and the number of times per day noise events will be loud enough to be heard. Use of other metrics as supplements to DNL has been endorsed by federal agencies (FICON 1992).




*Source: Schultz, 1978*

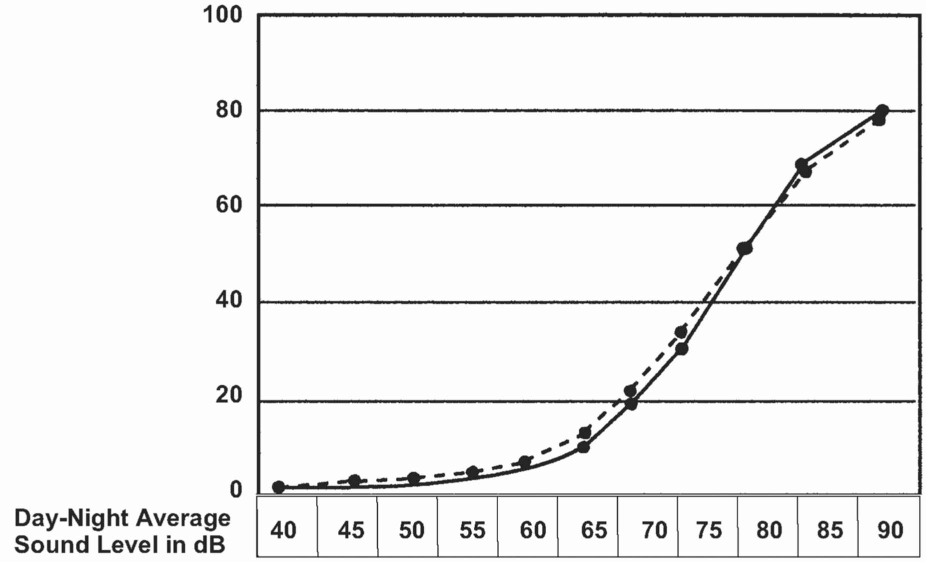
**LEGEND**

- - - - - $\%HA = 0.8553 L_{dn} - 0.0401 L_{dn}^2 + 0.00047 L_{dn}^3$

—— All 161 Data Points Given Equal Weight

All Surveys Given Equal Weight

**Figure C-1 Community Surveys of Noise Annoyance**




| Calculated % HA Points | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FINEGOLD | 0.41 | 0.83 | 1.66 | 3.31 | 6.48 | 12.3 | 22.1 | 36.5 | 53.7 | 70.2 | 82.6 |
| | SCHULTZ | 0.58 | 1.11 | 2.12 | 4.03 | 7.52 | 13.6 | 23.3 | 37.1 | 53.3 | 68.8 | 81 |

***LEGEND***

Finegold DATA 400 POINTS (Finegold *et al*. 1992)
%HA = 100/[1+EXP (11.13 - 0.141 LDN)]

SCHULTZ DATA 161 POINTS
%HA = 100/[1 + exp (10.43 - 0.132 LDN)]

HA = Highly Annoyed

**Figure C-2 Response of Communities to Noise; Comparison of Original (Schultz 1978) and Current (Finegold et al. 1994) Curve Fits**

The Schultz curve is generally applied to annual average DNL. In section 1.2.6, $L_{dnmr}$ was described and presented as being appropriate for quantifying noise in military airspace. In the current study, the Schultz curve is used with $L_{dnmr}$ as the noise metric. $L_{dnmr}$ is always equal to or greater than DNL, so impact is generally higher than would have been predicted if the onset rate and busiest-month adjustments were not accounted for.

Sonic boom exposure is measured by C-weighting, with the corresponding cumulative metric being CDNL. Correlation between CDNL and annoyance has been established, based on community reaction to impulsive sounds (CHABA 1981). Values of the C-weighted equivalent to the Schultz curve are different than that of the Schultz curve itself. Table C-1 shows the relation between annoyance, DNL and CDNL.

**Table C-1 Relation Between Annoyance, DNL and CDNL**

| *CDNL* | *% Highly Annoyed* | *DNL* |
|---|---|---|
| 48 | 2 | 50 |
| 52 | 4 | 55 |
| 57 | 8 | 60 |
| 61 | 14 | 65 |
| 65 | 23 | 70 |
| 69 | 35 | 75 |

There are several points of interest in the noise-annoyance relation. The first is DNL of 65 dB. This is a level most commonly used for noise planning purposes, and represents a compromise between community impact and the need for activities like aviation that do cause noise. Areas exposed to DNL above 65 dB are generally not considered suitable for residential use. The second is DNL of 55 dB, which was identified by EPA as a level below which there is effectively no adverse impact (USEPA 1972). The third is DNL of 75 dB. This is the lowest level at which adverse health effects could be credible (USEPA 1972). The very high annoyance levels make such areas unsuitable for residential land use.

Interpretation of CDNL from impulsive noise is accomplished by using the CDNL versus annoyance values in Table C-1. CDNL can be interpreted in terms of an "equivalent annoyance" DNL, e.g., CDNL of 52, 61, and 69 dB are equivalent to DNL of 55, 65, and 75 dB, respectively. If both continuous and impulsive noise occurs in the same area, impacts are assessed separately for each.

### 1.3.2. Land Use Compatibility

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the Day-Night Average Sound Level or Onset-Rate Adjusted Day-Night Average Sound Level for military overflights. Impulsive noise can be assessed by relating CDNL to an "equivalent annoyance" DNL, as outlined in section 1.3.1.

In June 1980, an ad hoc Federal Interagency Committee on Urban Noise published guidelines (FICUN 1980) relating Day-Night Average Sound Levels to compatible land uses. This committee was composed of representatives from the United States Departments of Defense, Transportation, as well as the Housing and Urban Development; the Environmental Protection Agency; and the Veterans Administration. Since the issuance of these guidelines, federal agencies have generally adopted these guidelines for their noise analyses.

Following the lead of the committee, the Department of Defense and the Federal Aviation Administration (FAA) adopted the concept of land-use compatibility as the accepted measure of aircraft noise effect. The FAA included the committee's guidelines in the Federal Aviation Regulations (USDOT 1984). These guidelines are reprinted in Table C-2, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (note the footnote "*" in the table), they provide the best means for determining noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor Day-Night Average Sound Levels (DNL values) above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions. In some cases, where noise change exceeds 3dB, the 1992 FICON indicates the 60dB DNL may be a more appropriate incompatibility level for densely populated areas.

## 2.0 NOISE EFFECTS

The discussion in section 1.3 presents the global effect of noise on communities. The following sections describe particular noise effects.

### 2.1 HEARING LOSS

Noise-induced hearing loss is probably the best defined of the potential effects of human exposure to excessive noise. Federal workplace standards for protection from hearing loss allow a time-average level of 90 dB over an 8-hour work period, or 85 dB averaged over a 16-hour period. Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4,000 Hz, after a 40-year exposure) suggests a time-average sound level of 70 dB over a 24-hour period (USEPA 1972). Since it is unlikely that airport neighbors will remain outside their homes 24 hours per day for extended periods of time, there is little possibility of hearing loss below a Day-Night Average Sound Level of 75 dB, and this level is extremely conservative.

### 2.2 NONAUDITORY HEALTH EFFECTS

Nonauditory health effects of long-term noise exposure, where noise may act as a risk factor, have not been found to occur at levels below those protective against noise-induced hearing loss, described above. Most studies attempting to clarify such health effects have found that noise exposure levels established for hearing protection will also protect against any potential nonauditory health effects, at least in workplace conditions. The best scientific summary of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on 22–24 January 1990 in Washington, D.C., which states the following: "The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an eight-hour day). At the International Congress (1988) on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous.

**Table C-2 Land-Use Compatibility With Yearly Day-Night Average Sound Levels**

| Land Use | Yearly Day-Night Average Sound Level (DNL) in Decibels | | | | | |
|---|---|---|---|---|---|---|
| | **Below 65** | **65–70** | **70–75** | **75–80** | **80–85** | **Over 85** |
| **Residential** | | | | | | |
| Residential, other than mobile homes and transient lodgings | Y | N(1) | N(1) | N | N | N |
| Mobile home parks | Y | N | N | N | N | N |
| Transient lodgings | Y | N(1) | N(1) | N(1) | N | N |
| **Public Use** | | | | | | |
| Schools | Y | N(1) | N(1) | N | **N** | **N** |
| Hospitals and nursing homes | Y | 25 | 30 | N | N | N |
| Churches, auditoria, and concert halls | Y | 25 | 30 | N | N | N |
| Government services | Y | Y | 25 | 30 | N | N |
| Transportation | Y | Y | Y(2) | Y(3) | Y(4) | Y(4) |
| Parking | Y | Y | Y(2) | Y(3) | Y(4) | N |
| **Commercial Use** | | | | | | |
| Offices, business and professional | Y | Y | 25 | 30 | N | N |
| Wholesale and retail—building materials, hardware, and farm equipment | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Retail trade—general | Y | Y | 25 | 30 | N | N |
| Utilities | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Communication | Y | Y | 25 | 30 | N | N |
| **Manufacturing and Production** | | | | | | |
| Manufacturing, general | Y | Y | Y(2) | Y(3) | Y(4 ) | N |
| Photographic and optical | Y | Y | 25 | 30 | N | N |
| Agriculture (except livestock) and forestry | Y | Y(6) | Y(7) | Y(8) | Y(8) | Y(8) |
| Livestock farming and breeding | Y | Y(6) | Y(7) | N | N | N |
| Mining and fishing, resource production and extraction | Y | Y | Y | Y | Y | Y |
| **Recreational** | | | | | | |
| Outdoor sports arenas and spectator sports | Y | Y(5) | Y(5) | N | N | N |
| Outdoor music shells, amphitheaters | Y | N | N | N | N | N |
| Nature exhibits and zoos | Y | Y | N | N | N | N |
| Amusements, parks, resorts, and camps | Y | Y | Y | N | N | N |
| Golf courses, riding stables, and water recreation | Y | Y | 25 | 30 | N | N |

Numbers in parentheses refer to notes.

* The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

KEY TO TABLE C-2

SLUCM = Standard Land-Use Coding Manual.
Y (YES) = Land Use and related structures compatible without restrictions.
N (No) = Land Use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35 = Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.

NOTES FOR TABLE C-2

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
(2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(3) Measures to achieve NLR 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(5) Land-use compatible provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25.
(7) Residential buildings require an NLR of 30.
(8) Residential buildings not permitted.

Consequently, it can be concluded that establishing and enforcing exposure levels would not only solve the noise-induced hearing loss problem but would also protect against any potential nonauditory health effects in the work place (von Gierke 1990).

Although these findings were directed specifically at noise effects in the work place, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies which purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, in an often-quoted paper, two UCLA researchers found a relation between aircraft noise levels under the approach path to Los Angeles International Airport (LAX) and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the "noise-exposed" population (Meecham and Shaw 1979). Nevertheless, three other UCLA professors analyzed those same data and found no relation between noise exposure and mortality rates (Frerichs *et al.* 1980).

As a second example, two other UCLA researchers used this same population near LAX to show a higher rate of birth defects during the period of 1970 to 1972 when compared with a control group residing away from the airport (Jones and Tauscher 1978). Based on this report, a separate group at the U.S. Centers for Disease Control performed a more thorough study of populations near Atlanta's Hartsfield International Airport for 1970 to 1972 and found no relation in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Edmonds 1979).

A recent review of health effects, prepared by a Committee of the Health Council of The Netherlands (CHCN 1996) reviewed currently available published information on this topic. They concluded that the threshold for possible long-term health effects was a 16-hour (0600 to 2200) $L_{eq}$ of 70 dB. Projecting this to 24 hours and applying the 10 dB nighttime penalty used with DNL, this corresponds to DNL of about 75 dB. The study also affirmed the risk threshold for hearing loss, as discussed earlier.

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

## 2.3 ANNOYANCE

The primary effect of aircraft noise on exposed communities is one of annoyance. Noise annoyance is defined by the U.S. Environmental Protection Agency as any negative subjective reaction on the part of an individual or group (USEPA 1972). As noted in the discussion of Day-Night Average Sound Level above, community annoyance is best measured by that metric.

Because the EPA Levels Document (USEPA 1972) identified DNL of 55 dB as ". . . requisite to protect public health and welfare with an adequate margin of safety," it is commonly assumed that 55 dB should be adopted as a criterion for community noise analysis. From a noise exposure perspective, that would be an ideal selection. However, financial and technical resources are generally not available to achieve that goal. Most agencies have identified DNL of 65 dB as a criterion which protects those most impacted by noise, and which can often be achieved on a practical basis (FICON 1992). This corresponds to about 13 percent of the exposed population being highly annoyed.

Although DNL of 65 dB is widely used as a benchmark for significant noise impact, and is often an acceptable compromise, it is not a statutory limit and it is appropriate to consider other thresholds in particular cases.

In this EIS, no specific threshold is used. The noise in the affected environment is evaluated on the basis of the information presented in this appendix and in the body of the EIS. Particular attention is given to the ideal 55 dB identified by EPA.

Community annoyance from sonic booms is based on CDNL, as discussed in Section 1.3. Particular effects often cited for sonic booms include startle and task interference. These effects are implicitly included in the "equivalent annoyance" CDNL values in Table C-1, since those were developed from actual community noise impact.

## 2.4 SPEECH INTERFERENCE

Speech interference associated with aircraft noise is a primary cause of annoyance to individuals on the ground. The disruption of routine activities such as radio or television listening, telephone use, or family conversation gives rise to frustration and irritation. The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. Research has shown that the use of the Sound Exposure Level metric will measure speech interference successfully, and that a Sound Exposure Level exceeding 65 dB will begin to interfere with speech communication.

## 2.5 SLEEP INTERFERENCE

Sleep interference is another source of annoyance associated with aircraft noise. This is especially true because of the intermittent nature and content of aircraft noise, which is more disturbing than continuous noise of equal energy and neutral meaning.

Sleep interference may be measured in either of two ways. "Arousal" represents actual awakening from sleep, while a change in "sleep stage" represents a shift from one of four sleep stages to another stage of lighter sleep without actual awakening. In general, arousal requires a somewhat higher noise level than does a change in sleep stage.

An analysis sponsored by the U.S. Air Force summarized 21 published studies concerning the effects of noise on sleep (Pearsons *et al.* 1989). The analysis concluded that a lack of reliable in-home studies, combined with large differences among the results from the various laboratory studies, did not permit development of an acceptably accurate assessment procedure. The noise events used in the laboratory studies and in contrived in-home studies were presented at much higher rates of occurrence than would normally be experienced. None of the laboratory studies were of sufficiently long duration to determine any effects of habituation, such as that which would occur under normal community conditions. A recent extensive study of sleep interference in people's own homes (Ollerhead 1992) showed very little disturbance from aircraft noise.

There is some controversy associated with the recent studies, so a conservative approach should be taken in judging sleep interference. Based on older data, the U.S. Environmental Protection Agency identified an indoor Day-Night Average Sound Level of 45 dB as necessary to protect against sleep interference

(USEPA 1972). Assuming a very conservative structural noise insulation of 20 dB for typical dwelling units, this corresponds to an outdoor Day-Night Average Sound Level of 65 dB as minimizing sleep interference.

A 1984 publication reviewed the probability of arousal or behavioral awakening in terms of Sound Exposure Level (Kryter 1984). Figure C-3, extracted from Figure 10.37 of Kryter (1984), indicates that an indoor Sound Exposure Level of 65 dB or lower should awaken less than 5 percent of those exposed. These results do not include any habituation over time by sleeping subjects. Nevertheless, this provides a reasonable guideline for assessing sleep interference and corresponds to similar guidance for speech interference, as noted above.

## 2.6 NOISE EFFECTS ON DOMESTIC ANIMALS AND WILDLIFE

Animal species differ greatly in their responses to noise. Each species has adapted, physically and behaviorally, to fill its ecological role in nature, and its hearing ability usually reflects that role. Animals rely on their hearing to avoid predators, obtain food, and communicate with and attract other members of their species. Aircraft noise may mask or interfere with these functions. Secondary effects may include nonauditory effects similar to those exhibited by humans: stress, hypertension, and other nervous disorders. Tertiary effects may include interference with mating and resultant population declines.

There are available many scientific studies regarding the effects of noise on wildlife and some anecdotal reports of wildlife "flight" due to noise. Few of these studies or reports include any reliable measures of the actual noise levels involved. However, in the absence of definitive data on the effect of noise on animals, the Committee on Hearing, Bioacoustics, and Biomechanics of the National Research Council has proposed that protective noise criteria for animals be taken to be the same as for humans (NRC NAS 1977).

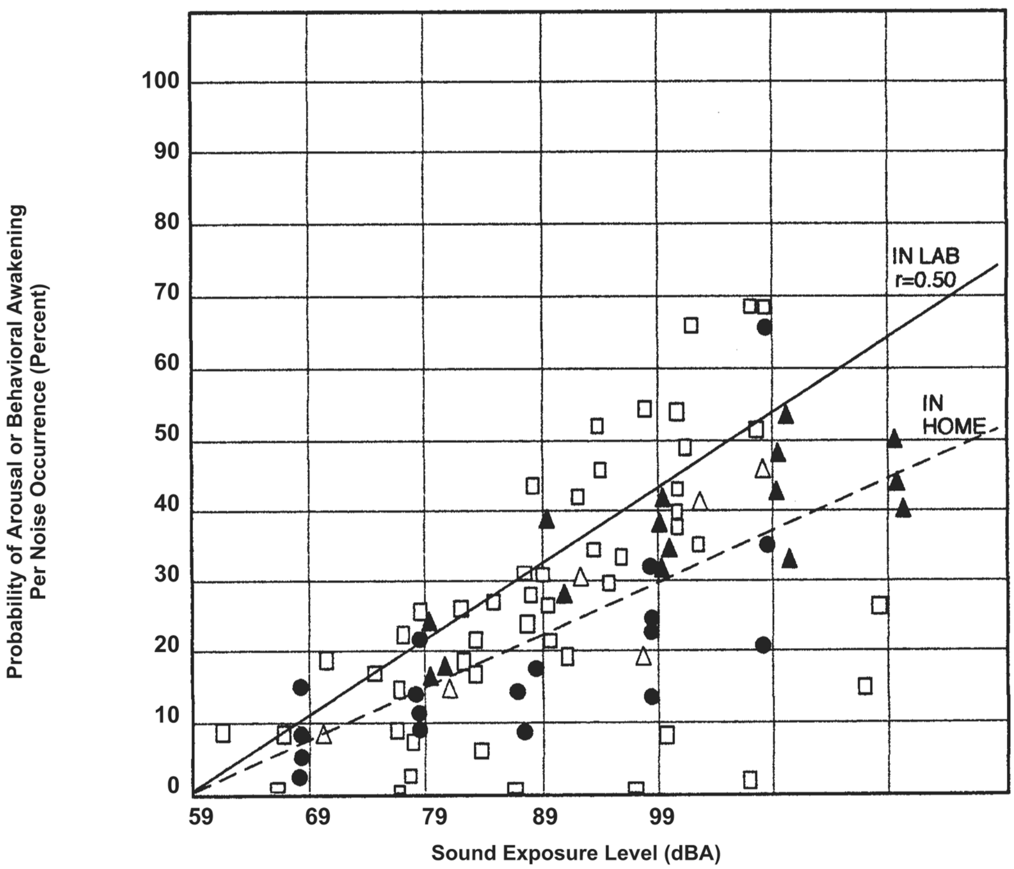
## 2.7 NOISE EFFECTS ON STRUCTURES

### 2.7.1 Subsonic Aircraft Noise

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB, there is the possibility of the excitation of structural component resonance. While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (NRC NAS 1977).

A recent study, directed specifically at low-altitude, high-speed aircraft showed that there is little probability of structural damage from such operations (Sutherland 1989). One finding in that study is that sound levels at damaging frequencies (e.g., 30 Hz for window breakage or 15 to 25 Hz for whole-house response) are rarely above 130 dB.

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Window panes may also vibrate noticeably when exposed to high levels of airborne




**LEGEND**

- □ Laboratory Studies, Variety of Noises, Lukas
- ● Steady State (In Home)
- ▲ Transient (In Home)
- △ Truck Noise, Laboratory Study, Thiesen
  Transformer, Transmission Line, Window Air Conditioner, and Distant Traffic Noise, Horonjeff

**Figure C-3 Probability of Arousal or Behavioral Awakening in Terms of Sound Exposure Level**

noise, causing homeowners to fear of breakage. In general, such noise-induced vibrations occur at sound levels above those considered normally incompatible with residential land use. Thus assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

### 2.7.2 Sonic Boom

Sonic booms are commonly associated with structural damage. Most damage claims are for brittle objects, such as glass and plaster. Table C-3 summarizes the threshold of damage that might be expected at various overpressures. There is a large degree of variability in damage experience, and much damage depends on the pre-existing condition of a structure. Breakage data for glass, for example, spans a range of two to three orders of magnitude at a given overpressure. While glass can suffer damage at low overpressures, as shown in Table C-3, laboratory tests of glass (White 1972) have shown that properly installed window glass will not break at overpressures below 10 psf, even when subjected to repeated booms. In general, structural damage from sonic booms should be expected only for overpressures above 10 psf.

## 2.8 NOISE EFFECTS ON TERRAIN

Members of the public often perceive that noise from low-flying aircraft can cause avalanches or landslides by disturbing fragile soil or snow structures, especially in mountainous areas, causing landslides or avalanches. There are no known instances of such effects, and it is considered improbable that such effects will result from routine, subsonic aircraft operations.

## 2.9 NOISE EFFECTS ON HISTORICAL AND ARCHAEOLOGICAL SITES

Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Again, there are few scientific studies of such effects to provide guidance for their assessment.

One study involved the measurements of sound levels and structural vibration levels in a superbly restored plantation house, originally built in 1795, and now situated approximately 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport (IAD). These measurements were made in connection with the proposed scheduled operation of the supersonic Concorde airplane at Dulles (Wesler 1977). There was special concern for the building's windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning within the building itself.

As noted above for the noise effects of noise-induced vibrations of normal structures, assessments of noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites.

| Table C-3 Possible Damage to Structures From Sonic Booms | | |
|---|---|---|
| *Sonic Boom Overpressure Nominal (psf)* | *Type of Damage* | *Item Affected* |
| 0.5 - 2 | Cracks in plaster | Fine cracks; extension of existing cracks; more in ceilings; over door frames; between some plaster boards. |
| | Cracks in glass | Rarely shattered; either partial or extension of existing. |
| | Damage to roof | Slippage of existing loose tiles/slates; sometimes new cracking of old slates at nail hole. |
| | Damage to outside walls | Existing cracks in stucco extended. |
| | Bric-a-brac | Those carefully balanced or on edges can fall; fine glass, e.g., large goblets, can fall and break. |
| | Other | Dust falls in chimneys. |
| 2 - 4 | Glass, plaster, roofs, ceilings | Failures show that would have been difficult to forecast in terms of their existing localized condition. Nominally in good condition. |
| 4 - 10 | Glass | Regular failures within a population of well-installed glass; industrial as well as domestic greenhouses. |
| | Plaster | Partial ceiling collapse of good plaster; complete collapse of very new, incompletely cured, or very old plaster. |
| | Roofs | High probability rate of failure in nominally good state, slurry-wash; some chance of failures in tiles on modern roofs; light roofs (bungalow) or large area can move bodily. |
| | Walls (out) | Old, free standing, in fairly good condition can collapse. |
| | Walls (in) | Inside ("Party") walls known to move at 10 psf. |
| Greater than 10 | Glass | Some good glass will fail regularly to sonic booms from the same direction. Glass with existing faults could shatter and fly. Large window frames move. |
| | Plaster | Most plaster affected. |
| | Ceilings | Plaster boards displaced by nail popping. |
| | Roofs | Most slate/slurry roofs affected, some badly; large roofs having good tile can be affected; some roofs bodily displaced causing gale-end and will-plate cracks; domestic chimneys dislodged if not in good condition. |
| | Walls | Internal party walls can move even if carrying fittings such as hand basins or taps; secondary damage due to water leakage. |
| | Bric-a-brac | Some nominally secure items can fall; e.g., large pictures, especially if fixed to party walls. |

*Source*: Haber and Nakaki 1989

# 3.0 NOISE MODELING

## 3.1 SUBSONIC AIRCRAFT NOISE

An aircraft in subsonic flight generally emits noise from two sources: the engines and flow noise around the airframe. Noise generation mechanisms are complex, and in practical models the noise sources must be based on measured data. The Air Force has developed a series of computer models and aircraft noise databases for this purpose. The models include NOISEMAP (Moulton 1992) for noise around airbases, ROUTEMAP (Lucas and Plotkin 1988) for noise associated with low-level training routes and MR_NMAP (Lucas and Calamia 1996) for use in MOAs and ranges. These models use the NOISEFILE database developed by the Air Force. NOISEFILE data includes SEL and $L_{Amax}$ as a function of speed and power setting for aircraft in straight flight.

Noise from an individual aircraft is a time-varying continuous sound. It is first audible as the aircraft approaches, increases to a maximum when the aircraft is near its closest point, then diminishes as it departs. The noise depends on the speed and power setting of the aircraft, and its trajectory. The models noted above divide the trajectory into segments whose noise can be computed from the data in NOISEFILE. The contributions from these segments are summed.

MR_NMAP was used to compute noise levels in the MOAs and warning areas. The primary noise metric computed by MR_NMAP was $L_{dnmr}$ averaged over each airspace. The program was also used to compute the number of times per day that SEL of 65 dB would be exceeded at any given location in the range complex. Supporting routines from NOISEMAP were used to calculate SEL and $L_{Amax}$ for various flight altitudes and lateral offsets from a ground receiver position.

## 3.2 SONIC BOOM

When an aircraft moves through the air, it pushes the air out of its way. At subsonic speeds, the displaced air forms a pressure wave that disperses rapidly. At supersonic speeds, the aircraft is moving too quickly for the wave to disperse, so it remains as a coherent wave. This wave is a sonic boom. When heard at the ground, a sonic boom consists of two shock waves (one associated with the forward part of the aircraft, the other with the rear part) of approximately equal strength and (for fighter aircraft) separated by 100 to 200 milliseconds. When plotted, this pair of shock waves and the expanding flow between them have the appearance of a capital letter “N,” so a sonic boom pressure wave is usually called an “N-wave.”

The ground pattern of a sonic boom depends on the size, shape, speed, and trajectory of the aircraft. The Air Force’s PCBoom3 computer program (Plotkin 1996) can be used to compute sonic boom for a given single event. Supersonic operations for the proposed action and four alternatives are associated with air-to-air activity, however, which can best be described statistically. Accordingly, cumulative sonic boom impact (CDNL) was computed using the Air Force’s BOOMAP model (Frampton *et al.* 1993). This is based on measurements of sonic booms, together with analysis of tracking data, four major field studies. BOOMAP provides CDNL in a supersonic air combat arena, plus the average number of booms per day that would be heard at any given location.

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# APPENDIX D

## INTERGOVERNMENTAL AND INTERAGENCY COORDINATION OF ENVIRONMENTAL PLANNING AND CONTACT LIST

# APPENDIX D
# IICEP AND CONTACT LIST

Ms. Heather Elliott
Nevada State Clearinghouse
Department of Administration
209 E Musser St. – Room 200
Carson City, NV 89701-4298

Mr. Richard Berger
Project Leader
Desert National Wildlife Range
1500 North Decatur Boulevard
Las Vegas, NV 89108

Mr. Mike Dwyer
District Manager
Bureau of Land Management
4765 W. Vegas Drive
Las Vegas, NV 89108

Mr. Robert Williams
Field Supervisor
U.S. Fish and Wildlife Service
Nevada Ecological Field Office
1340 Financial Blvd – Room 234
Reno, NV 89502

Mr. Ronald James
State Historic Preservation Office
100 N. Stewart Street - Capitol Complex
Carson City, NV 89701-4285

Mr. Curtis Anderson
Tribal Chairperson
Las Vegas Paiute Colony

Ms. Geneal Andersen
Tribal Chairperson
Paiute Indian Tribes of Utah

Mr. Richard Arnold
Tribal Chairperson
Pahrump Paiute Tribe

Mr. Monty Bengochia
Tribal Chairperson
Bishop Paiute Indian Tribe

Mr. Henry Blackeye, Jr.
Tribal Chairperson
Duckwater Shoshone Tribe

Ms. Carmen Bradley
Tribal Chairperson
Kaibab Band of Southern Paiutes

Mr. Kevin Brady, Sr.
Tribal Chairperson
Yomba Shoshone Tribe

Ms. Vivienne-Caron Jake
Tribal Representative
Kaibab Band of Southern Paiutes

Mr. Felton Bricker, Jr.
Tribal Representative
Fort Mojave Tribe

Ms. Pauline Esteves
Tribal Chairperson
Timbisha Shoshone Tribe

Mr. Maurice Frank-Churchill
Tribal Representative
Yomba Shoshone Tribe

Ms. Candice Grayman
Tribal Chairperson
Moapa Band of Paiutes

Ms. Nora Helton
Tribal Chairperson
Fort Mojave Tribe

Ms. Rachel Joseph
Tribal Chairperson
Lone Pine Paiute Shoshone Tribe

Mr. Arthur Kaamasee
Tribal Chairperson
Ely Shoshone Indian Tribe

Mr. Jesse Leeds
Chairman of the Board of Directors
Las Vegas Indian Center

Ms. Cheryl Levine
Tribal Chairperson
Big Pine Paiute Tribe of the Owens Valley

Mr. Vernon Miller
Tribal Chairperson
Fort Independence Indian Tribe

Ms. Gaylene Moose
Tribal Representative
Bishop Paiute Indian Tribe

Mr. Edward Smith
Tribal Chairperson
Chemehuevi Indian Tribe

# APPENDIX E

# DISTRIBUTION LIST

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# DISTRIBUTION LIST

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North Las Vegas NV 89101

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2797 North Green Valley Pkwy
Las Vegas NV 89014

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715 W Gretta Lane
Indian Springs NV 89018

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Las Vegas NV 89154-7013

Las Vegas Library
833 N Las Vegas Blvd
Las Vegas NV 89101

Nevada State Library and Archives
Federal Publications
100 N. Stewart Street
Carson City NV 89701-8327

North Las Vegas City Public Library
2300 Civic Center Drive
North Las Vegas NV 89030

Nevada State Clearinghouse
Department of Administration
209 E Musser St – Room 200
Carson City NV 89701

Ronald James
State Historic Preservation Officer
Historic Preservation Office

Mr. Robert Williams, Field Supervisor
U.S. Fish and Wildlife Service
Nevada Fish and Wildlife Office

Richard Berger
Desert National Wildlife Range

Mike Dwyer, District Manager
Bureau of Land Management

Ronald E. Wallace
Defense Systems